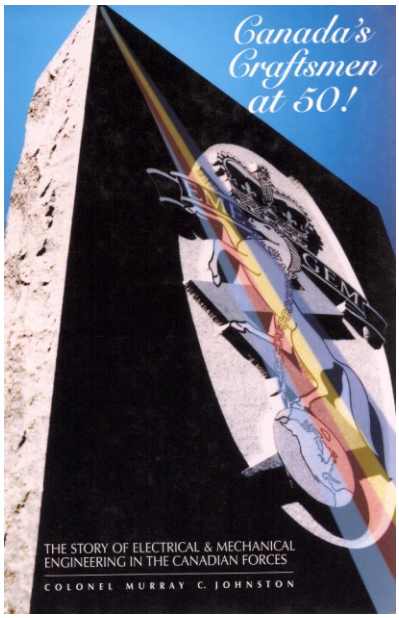

CANADA'S CRAFTSMEN AT 50!

The Story of
Electrical and Mechanical Engineering
in the Canadian Armed Forces

up to and including

The 50th Anniversary
of the formation of the
Corps of Royal Canadian
Electrical and Mechanical Engineers

by
Colonel Murray C. Johnston

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Note: Text that was not included in the printed book is in parenthesis {}.

FOREWORD

The year 1994 marks the fiftieth anniversary of many significant battles and events of the Second World War. Names such as the Liri Valley, Normandy, Ortona, and the Scheldt will live on in the hearts of veterans and serving soldiers alike, as well as on the battle honours of many of Canada's regiments and corps.

Although its origins well precede that epic struggle, the Corps of Royal Canadian Electrical and Mechanical Engineers was founded in 1944. Since that time, the soldier/technicians of the Corps have served the Canadian Army and Canadian Forces with distinction. They have maintained the operational readiness of the equipment they were required to support to a standard envied by all, matched by few, and surpassed by none. While the Corps may have changed names from time to time, it has consistently met adversity and overcome it, due in large part to its unchanging virtues: an eager dedication to the Army and the Canadian Forces alike, and an indomitable spirit.

This book is not only a Corps history but a living and vivid account of how the EME Branch came to be, its exploits during war, its efforts on United Nations duty and the challenges it faces today. With a global milieu in flux and an unprecedented rate of technological change, the need for those who live by the motto *Arte et Marte* will undoubtedly grow. The price of mechanization and advanced technology is mechanics and technicians, but those who are also soldiers are not only valuable, but absolutely vital to any army which wishes to be able to fight and win on the modern battlefield.

The spirit and dedication shown by the EME Branch and its predecessors over the past half-century have ensured that the future can only be bright for Canada's Craftsmen.

Lieutenant-General G.M. Reay, CMM, MBE, CD
Commander Land Force Command
St-Hubert. Que
August 1995

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PREFACE

In 1991 I was asked to consider writing an update of *Canada's Craftsmen*. I had a concern about that. Would rewriting our Branch history ten years after the publication of *Canada's Craftsmen* be considered a mere rehash of the old? Not so, as events have shown. Much has happened in the past decade. The Cold War was won. The Gulf War was fought. Peacekeeping took a quantum jump in intensity and frequency. Deficit reduction and recession hit Canada. The EME Branch got its "horse" back and celebrated 50 years of EME services to Canada's Armed Forces.

In fact there is now more than enough material to write a book based only on the past ten years. Writing a book only on that period would be easy. However, it would separate the past from the present. Furthermore, as I interviewed Craftsmen wherever I met them in stations, bases and UN missions, I could see from their experiences a smooth steady evolution of the EME Branch from a corps created in the crucible of war to to-day's strong "regiment of very many, very small units - everywhere." What I found was an EME Branch that had, "Pride in its past and faith in its future."

So this book spans the past fifty years and more. It is not a mere rehash of old stuff in a new package. Rather, it is a story of young people continuing to build on the experiences of their predecessors in keeping equipment available for operations. From their experiences emerges an image of Canada's Craftsman as the Mobile Repair Team commander and his/her team doing a difficult job under dirty, dangerous conditions - and doing it well.

Keep that image in mind as you read this book. Remember that as long as humans continue to become more dependent on sophisticated equipment to help them fight their battles or keep the peace, there will be a need for craftsmen to keep that equipment fit for operations.

Ten years ago I wrote, "Insight, pride and perspective can help to-day's Craftsman to do a better job." It remains the aim of this book.

This book is the product of the assistance of many people. There are those who researched, edited and drafted parts of the book. They include Brigadier-General R.B. Screaton, Colonel P.J. Holt, Lieutenant-Colonels P.A. Vlossak, P.D. Kerr and R.J. Vincent, Chief Warrant Officer E.A. Rest, editor Jonathan Côté, translator Claude Lebel, contributing writers William Andryc and Dick Gatien, and the team from the Canadian Forces Training Material Publication Centre. Some helped verify details such as Leading-Seaman R. Amyotte who looked up countless names and initials. Many others wrote articles or letters, donated pictures, files and papers or were interviewed. Their names are included in the narrative where I have used their information and ideas. There are those who reviewed and proofread the various drafts of the manuscript. Their comments and criticism were of great help, particularly those of Colonels K.R. Ward and J.C. Boughton and my wife, Joan. Finally, the encouragement and dedicated work of four successive Branch Advisers, Lieutenant-Colonel D.W. Clarke, Captain S. McDonald, Captain Marie Robichaud, Ms. Marie Delisle and Mrs. Katherine Taylor got the book published. In total, the names of those who assisted in the production of this book are legion. I am grateful to them all.

This book never would have happened without the behind the scenes support of my wife, Joan. For forty years she has faithfully followed the flag. This book is dedicated to her and the thousands of other wives and sweethearts who have kept the home fires burning. They are Craftsmen too. This book is also dedicated to Janice and Jenny, my two daughters, and to the sons and daughters of all Craftsmen - for they are the future of Canada and why we went to war and kept the peace.

Arte et Marte

Murray C. Johnston
Colonel
Colonel Commandant
Electrical and Mechanical Engineering Branch
March 1996

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COLONEL MURRAY C. JOHNSTON, MSM, CD

Colonel Johnston was born in 1933 and served for 31 years as a Regular Force officer from 1952 to 1983. From 1983 to 1991 he was the Director of the National Emergency Agency for Energy in the Department of Energy, Mines and Resources, as well as the Canadian Representative to the NATO Petroleum Planning Committee. Appointed EME Colonel Commandant in 1991, he held the appointment for 13 years until May 15, 2004.

A graduate of the Royal Military College of Canada and of the Canadian Army Staff College, he is a Registered Professional Engineer, and holds a Bachelors Degree in Engineering from the University of Brutish Columbia and a Masters Degree in Automotive Engineering from the University of Michigan.

His postings have included: NDHQ as Director Support Vehicles Engineering and Maintenance, Director of Program Plans and Team Leader in the DEVIL Maintenance System Working Group; 202 Workshop Depot as Commanding Officer; the International Commission for Control and Supervision (Vietnam 1973) as a Region Commander in the Mekong Delta; Headquarters Mobile Command as Senior Staff Officer Maintenance; Ottawa Militia District as GSO1; 4 Field Workshop(RCEME) in Germany as Recovery Platoon Officer and 2IC; the Land Engineering Test Establishment as a test engineer on the Bobcat and M113A1 Armoured Personnel Carriers; 2RCHA Light Aid Detachment as Commanding Officer and 213 Workshop (RCEME) in Winnipeg as Control Officer.

He is a Past-President of the Royal Military Colleges Club of Canada, the Friends of the Canadian War Museum, and the EME Association, and is a former Vice-Chairman of the Conference of Defence Associations. From 1997 to 2008 he was a Director of the Perley and Rideau Veterans' Health Centre in Ottawa. Currently he is a member of Branch 616 of the Royal Canadian Legion, a volunteer guide at the Canadian War Museum, President of the RCEME Association, and the EME Branch Historian.

In 2002, on the recommendation of the Royal Canadian Legion for his work on behalf of veterans and remembrance, he was awarded a Queen's Golden Jubilee Medal. In 2003, at the request of the EME soldiers in Bosnia, he was awarded a NATO SFOR medal in recognition of his 10 trips to the Balkans, including Croatia, Kosovo and Bosnia to visit them.

On 25 October 2004, the Governor-General awarded him the Meritorious Service Medal in the military division:

> "*Col Johnston (retired) has served with tireless dedication and selflessness as Colonel Commandant of the Electrical and Mechanical Engineering Branch of the Canadian Forces since 1991. He has researched and written two authoritative books on the history of the Branch, and developed the Branch's Honour Roll. His visits across Canada and to soldiers deployed throughout the world, along with his participation in countless charitable and volunteer military support organizations, have been instrumental in bridging the gap between the sacrifices made by Canadian Forces veterans and today's serving soldiers.*"

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A NOTE ON NOMENCLATURE, NAMES AND TITLES

Canada's Craftsmen have had a separate identity as an engineering corps for over 50 years. For 24 years their name was RCEME, then for 16 it was LORE, then for 10 it was LEME. On their 50th Anniversary it became EME. To simplify the text, EME is used when referring generally to events and activities which cover one or more of these periods. For example, instead of, "RCEME/LORE/LEME/EM-E tradesmen", I have used "EME tradesmen". If, however, the event or activity is specific to one name then that name shall be used, e.g. "RCEME tradesmen".

The names of EME organizations have changed frequently as the size and responsibilities of these organizations have evolved. Tracing the history of these organizations can, therefore, be difficult. To help, the most recent names of some organizations are listed in the first part of the Index followed by a list of former names.

The title of the EME Journal in French has had four versions, "Journal du GEM", "GEM Journal", "Journal GEM" and "La Revue GEM". To simplify matters, the current title, "La Revue GEM", will be used to refer to all four.

PREFACE TO THE ELECTRONIC EDITION

This electronic edition contains the original text of *Canada's Craftsmen at 50!* before it was sent to the publishers. At that time, space limitations required that the text be reduced before printing, so this edition contains information that was not included in the printed book. This text is noted in parenthesis {}.

I included as many of the original photos from the printed book as I could find. Some could not be found and were eliminated. Should they come to light, they can be included in any future version.

The document has been converted for printing on 8½ by 11 paper, so the index in the printed book does not match the page numbering in this document. However, the index to this version should be accurate for the page numbering of the electronic text. In addition, the document can be searched using the search feature in the Adobe Reader®.

The notes and sources in the printed edition have been left as footnotes in the electronic edition.

Doug Knight
September 2008

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EARLY DEVELOPMENTS

The date chosen for the start of this story could have been 15 May 1944, the birth of RCEME. The date could also have been the outbreak of World War One when a Branch of the Canadian Ordnance Corps was responsible for workshops and artillery and was headed by the Principal Inspector of Ordnance Machinery. Both of these dates are milestones in the process of establishing and maintaining Canada's Craftsmen as a separately identifiable group in the Canadian Armed Forces.

Montage, clockwise from top left - World War One workshop vehicle, *Unknown*; assessing a Cardon-Loyd carrier as an artillery gun tractor during the Dragon trials, Barriefield - 1937, *The Col N.C. Sherman family*; interior of 3 Ordnance Workshop, Kingston, *The Col N.C. Sherman family*; 11 Ordnance Company, Esquimault in the 1930s; Workshop building at Petawawa under construction circa 1936, *The Col N.C. Sherman family*; developing a military truck circa 1939 *The late Col G.W. Beecroft*.

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Gun Maintenance - World War One. 9.5-inch Howitzer is overhauled near the front line. *Royal Canadian Artillery Museum*

Maintenance in the forward areas - World War One. A travelling workshop circa 1917. *Royal Canadian Artillery Museum*

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The start of mechanization. 1RCHA circa 1936 deployed for field manoeuvres in Camp Petawawa with Crosley staff cars, Leland trucks as gun tractors and 18-pounder guns with wooden wheels. *The Capt J.C. Holt family*

Designing equipment for Canada's Army. Ford experimental Canadian designed gun tractor circa 1938. *The Col N.C. Sherman family*

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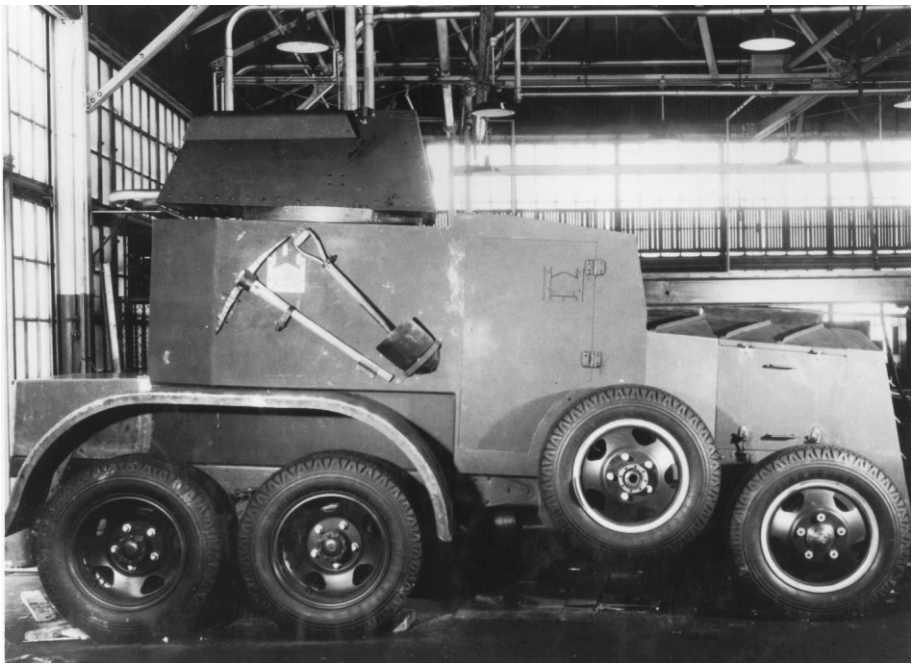

Designing equipment for Canada's Army. Experimental Canadian designed armoured car, circa 1938, with Marmon-Herrington 6x6 drive. *The Col N.C. Sherman family*

2 Army Field Workshop in Camp Petawawa - 1939. *Front row, left to right;* unknown, Lts W.L. Thompson and J.K. Bradford, Capt G.W. Beecroft, Maj H.G. Thompson, LCol N.C. Sherman (visiting and Lts A.S. Barber, H.L.K. Mason (visiting) and K.R. Ward (visiting). *The Col N.C. Sherman family*

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1

Chapter 1 - THE BEGINNINGS

Early Background, World War One, Between World Wars

{The roots of this story reach back much farther than the wars of this century and can be traced back to the start of civilization and the idea of making someone responsible, at least part time, for the maintenance of weapons and military equipment. Our story begins with the dawn of military history.}

Early Background

Ever since man learned to live together in communities, it was understood by all that the able-bodied members of the community were required to band together, bringing with them their weapons of defence for the mutual protection of the community. The repair or replacement of these weapons was the individual's responsibility. With the introduction of crew-served weapons such as slings, battering rams and catapults, as well as the growing complexity of weapons such as crossbows and chariots, there evolved a requirement for the organization of invention, manufacture and supply of weapons. Dionysios the Elder, ruler of Syracuse, Sicily in 399 BC, gathered skilled workmen by offering high wages, divided them into groups according to skills and offered bounties to any who created a supply of arms. In so doing, he launched the world's first ordnance department as well as the world's first research and development department.[1] During the next century, the Roman Army developed the capability to march 16 miles a day for four weeks. This was due to good roads and a well-organized supply train which included mobile repair shops and a service corps of engineers, artificers, armourers and other technicians.[2]

In British history the earliest reference to holding a planned inspection of arms is the Assize of Arms in 1181, which listed the minimum standard of arms and equipment to be maintained on behalf of the king.[3] A century later, Edward the 1st in 1289, issued an ordinance which provided for a planned inspection of arms and appointed an Attillator.[4]

Soldiers repaired their own weapons or they were repaired by master-bowyers, master-fletchers, master-smiths or other mechanics in service in the various strongholds in the country. In 1417, the title Attillator was changed to Master General of the Ordnance, to provide and maintain "engines of war" such as slings, battering rams, etc.[5,6]

The first English attempt to standardize soldiers' equipment was made in 1627 during the reign of Charles the 1st. Weapons issued by the Crown were identified by CR (Carolus Rex). However, the determining of holdings of weapons and their condition of serviceability and the hiring of qualified tradesmen to effect was still a problem. Hence, it was decreed that no one was to be allowed to make such repairs "until he had served an apprenticeship of seven years at the trade and understood the mysteries of making arms, pikes, guns or bandoliers."[3]

The restoration of Charles II to the throne in 1660 brought with it the formation of the first units of a regular army. This necessitated the creation in 1683 of a Board of Ordnance, including a technical officer known as the Surveyor-General who may be considered to be the forerunner of the present Head of the Corps of REME.[5]

1. de Camp, L. Sprague; *The Ancient Engineers*; Ballantine Books, New York, 1975; page 102.
2. *Encyclopedia Britannica*; 15th Edition, volume 19, 1976; page 591.
3. Forbes, MGen A.; *A History of the Army Ordnance Services*; Hodgson, LCol RA; *The Corps of RCEME - a History to 1 Oct 1946*; 1963; page 397.
4. Adams, George Burton; *Constitutional History Of England*; Henry Holt and Company, New York, 1940; page 303.
5. *RCOC Standing Orders*; 1965; page 11.
6. *Corps of RCEME*; Queen's Printer, 1953; page 3.

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The government still provided very little in the way of stores and equipment except camp equipment. In addition, regiments were obliged to replace equipment they could not repair. Hence, the practice of having regimental armourers was started. These maintainers were soldiers too. For example the 16th Lancers' armourer spiked the enemy's guns at the battle of Aliwal in 1846.[7] During these times, repairs in the field were limited, it being the custom in the artillery to attach a few civilian artificers such as wheelers and saddlers to batteries.

During the 19th century, the era of complex weapons began and many significant changes took place. One such change was the replacement of the Brown Bess musket with the Enfield rifle. As a result, interchangeable parts and standardized instruction, not heretofore required, were needed. Hence, in 1843 it was directed that all regimental armourers be instructed and tested at the then newly-founded small arms factory at Enfield.

Another significant change was the massive increase in the size of coastal defence guns. Specialists were required for their maintenance. Consequently, in 1885 three qualified engineers, Lane, Donoghue and Carly, were each given a special commission in the Royal Artillery as an Inspector of Ordnance Machinery (IOM). Today's EME officer in his role as engineer is descended from these three IOMs. After the Crimean War, investigation of the scandals connected with the supply and maintenance of equipment resulted in several reforms, one of which was that the Commander-in-Chief was made responsible for the maintenance of his equipment and another was the formation of two new technical corps, the Corps of Armourer Sergeants and the Corps of Ordnance Artificers. The Corps of Armourer Sergeants was formed in 1858 to inspect and repair small arms in storage or at the factory. The Corps of Ordnance Artificers was formed in 1882 to carry out inspection and repair of artillery in storage or at the factory. Their work complemented that of the unit armourers and the regimental artificers who remained on regimental strength. These two corps can be viewed as the start of two ideas: that of having several distinct levels of repair and that of having a technical, as well as fighting, corps in the army.

The spawning of these new technical corps also created problems. An investigation during the early 1890s showed that there were too many independent agencies involved in the care and maintenance of equipment. Hence, in 1896 the Ordnance Stores Department, which heretofore had been responsible only for warehousing and issue, was combined with the two technical corps to form the Army Ordnance Corps. This new corps was responsible for warehousing, maintenance and issue of equipment.

On 1 July 1903 Canada followed suit when the Canadian Stores Department was formed.[8] The total establishment was 106 and included 10 armourers and 3 artificers. There were no IOMs. Consequently, the British Army loaned Canada one IOM, Captain E.H. Robinson who, when the Imperial Army withdrew in 1905, continued to serve in Canada until 1908. He was followed by Captain Rodd who remained until the first Canadian IOMs were recruited in 1910.[9]

In 1907 the Canadian Stores Department was renamed Canadian Ordnance Corps (COC).[10] With the name change came the formation in the regular force of Permanent Active Militia (PAM) detachments of the corps, Det COC(PAM), one for each Military District except MD3 which had two, 3 Det COC(PAM) at Kingston and 9 Det COC(PAM) in Ottawa. Some of these detachments had small workshop sections. (see Appendix 1).

In 1910 two Canadian engineers were recruited to be IOMs. They were N.C. Sherman and A.S. Buttenshaw, who joined on 31 July and 1 August respectively.

Colonel Sherman served over 35 years, his career spanning the whole period of the Engineering Branch of the Royal Canadian Ordnance Corps (RCOC(E)) and the first few years of the Corps of Royal Canadian Electrical and Mechanical Engineers (RCEME). On completion of his training, he was posted to Esquimalt. During World War One he was moved to Ottawa where he set up the Inspection Department and certified proof and acceptance of guns. At the end of the war he was a member of an expeditionary force to Siberia. Between the wars he rose to become the first Chief Ordnance Mechanical Engineer. He went overseas with 5th Division in 1942. At war's end he was the Command EME at Pacific Command.

Brigadier Buttenshaw, on completion of his training, was posted to Halifax. On the outbreak of the

7. *Craftsmen of the Army*; Leo Cooper Ltd, London, 1970; page 3.
8. General Order 168/03; Hodgson, op.cit., page 523.
9. Sherman, Col N.C.; *The History of the Corps*; minutes of the RCEME Conference 1944; pages 7-10.
10. General Order 194 of 1907; *RCOC Standing Orders*; op.cit., page 3.

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war he went overseas with 1st Canadian Division as its IOM. After the war he joined the British Army, eventually becoming OME at Gibraltar. He participated in the formation of REME and became the first Commandant of the REME Training Centre at Arborfield, England.[11] Thus Canada's original IOMs became founding members of both REME and RCEME.

The first ordnance workshop to take part in a campaign was one which operated in South Africa in 1899-1902. British equipment at that time was relatively simple, however the need for making good the wear and tear on small arms, guns, wagons, etc, became apparent and the workshop fully justified itself and demonstrated the need and practicality of mobile workshops.[12]

Between the South African War and World War One, hydraulically-buffered recoil mechanisms were introduced into gun design. The new buffers greatly improved accuracy, flexibility and rate of gunfire but required increased maintenance resources - as soon became apparent.

World War One

At the outbreak of war three officers and five men constituted the staff of the Canadian Ordnance Corps. This small group rapidly expanded and set up headquarters in France. It was divided into four separate branches to meet the demands of supply and repair of the spreading conflict. One Branch was responsible for stores and ammunition, the second for clothing and Indian affairs and the third for personnel. The fourth Branch, headed by the Principal Inspector of Ordnance Machinery, was responsible for workshops and artillery.[13]

In the opening phases of World War the tactics of the past century were used, i.e. attacks by cavalry and foot soldiers over open ground. This led to an appalling loss of life to machine gun fire. To save lives Colonel A.G.L. McNaughton introduced mathematical calculations to improve the accuracy and rate of fire of artillery barrages fired before attacks. He also invented "rolling barrages" which were fired during attacks and "moved ahead" of advancing soldiers giving them a better measure of protection. The availability and accuracy of guns to fire these barrages became a decisive matter in the outcome of battle but required a regular schedule of buffer maintenance and bore measurements. This was done close to or in the battery locations. To move guns back would have kept them out of action much longer. Hence a workshop lorry was stationed at the front. Soon there were more. Their success may well have inspired the concept of Light Aid Detachments or LADs as they became known in World War Two.[13] To-day they are called unit maintenance platoons or troops.

Working in the forward locations also brought to light the valour of craftsmen in assuring the availability of guns for action. For example, in November 1917 the artillery battery of Armament Staff-Sergeant A.E. Davis was heavily shelled and five guns put out of action. After several hours of work under fire he succeeded in getting four guns back into action. During this time the gun officer and four men were wounded and two were killed. Staff-Sergeant Davis was awarded the Distinguished Conduct Medal for conspicuous gallantry and devotion to duty.[14]

In 1915 because the wastage of war was so great and industry had not yet completed its conversion to war production - there was a shortage of equipment, particularly rifles for reinforcements. Hence, salvage operations, regularly organized on a divisional basis, were started. Working closely with them were the repair establishments, initially comprising only unit armourers.

The unit armourer had little to do while his unit was in the line. Therefore, impromptu workshops were organized and staffed by all the armourers in the division, less one per brigade. They brought with them their tools, equipment and whatever components they had on hand. Working individually they could do little beyond light repairs. However when all their resources were pooled, they could take on much more extensive repairs, e.g. repair the division's machine guns, bicycles, replace rivets in helmets and, on a limited scale, manufacture parts. The workshops made their divisions self-supporting by repairing salvaged equipment and supplying spare parts by cannibalization and reclamation.

11. *Craftsmen of the Army*, op.cit., page 38.
12. Buttenshaw, Col A.S.; *Speech to Dominion representatives 1940*; Hodgson, op.cit., page 398.
13. Hodgson, LCol R.A.; *The Corps of RCEME - a History to 1 Oct 1946*; 1963, page 400.
14. Riddle, David K. and Mitchell, Donald G.; *The Distinguished Conduct Medal to the Canadian Expeditionary Force 1914-1920*; The Kirby-Marlton Press, Winnipeg, Manitoba.

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For the artillery, the success of the workshop lorries led to the formation of mobile workshops for the repair of guns and their equipment. Several types evolved to suit the types of artillery - light, medium or heavy. IOMs, artificers, workshop lorries and stores lorries in varying numbers comprised these shops. The first Canadian workshop was the Canadian Ordnance Travelling Workshop. It was formed in Halifax in October 1915 and staffed by the Permanent Force. Later in France it was renamed 26 Canadian Ordnance Mobile Workshop (Light). Two others soon followed and were redesignated 82 and 83 Canadian Ordnance Mobile Workshop, respectively.[13]

The value of these workshops made them a target for bombing by enemy aircraft. After one such raid in November 1918, a stores tent and an ammunition dump were set on fire. The Workshop Officer, Captain H. Durling, removed the petrol and workshop lorry to a safe place. While doing this he was in full view from the glare of the conflagration and was bombed by enemy airplanes. Through his efforts valuable property was rescued and repairs to the guns continued the next morning. Captain Durling was awarded the Military Cross.[15]

With the introduction of motor cars and trucks, a Motor Transport Section of the Canadian Army Service Corps (CASC) was created. The CASC did light repairs to its own vehicles, whereas Ordnance was given the responsibility for heavy repairs and overhaul, which, because the Army had so few vehicles, were done by contract. In practice, this system of split responsibility did not work. Heavy demand for transport and lack of clear division of responsibility led to the situation where the CASC kept vehicles forward and running as long as possible by patching. CASC preferred to supply parts to its forward shops rather than to Ordnance. When a vehicle was backloaded to Ordnance, it was a stripped derelict so that Ordnance mechanics wasted efforts in manufacturing parts. Hence in January 1915, responsibility for all vehicle repairs went to CASC. There was a CASC workshop with each division and cavalry brigade and one second echelon workshop with each corps headquarters.

The role of an IOM was primarily the inspection, modification and repair to artillery equipment. However, this was war and one field gun in France fired more rounds per day than did a six-gun battery during a year of peacetime. In addition, the guns were becoming bigger and more complicated and developing a host of heretofore unknown defects. Therefore, engineering analysis was needed in the field. For example, 34,000 bore measurements were made in 1917 alone to help in improved gun design and making accurate forecasts for gun replacements.

During World War One there was a tremendous increase in mechanization and technical advances which led to a commensurate demand for personnel for maintenance, repair and design. The basic concepts of field repair and engineering field data for design and maintenance improvements were developed and applied.

However, each of the main users of technical equipment - artillery, engineers, armour and service corps - created its own repair systems which led to a duplication in tools and workshop machinery and a heavy demand for tradesmen out of proportion to the total work involved. There were recommendations for the formation of a corps of mechanical engineers,[16] but that would have to wait until another war.

The war showed that Canada's Craftsmen would have to be able to repair equipment in the front lines in difficult, dirty and dangerous conditions often under fire. They would be soldier-technicians sharing the same hardships and dangers as frontline soldiers. The era of the soldier/engineer, soldier/technician had arrived.

15. Riddle and Mitchell; *The Military Cross to the Canadian Expeditionary Force 1915-1921*; The Kirby-Marlton Press, Winnipeg, Manitoba; page 94.
16. Hodgson, op.cit., page 367.

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Between World Wars

Organization, OMEs and Tiffies, Workshop Life, Training Craftsmen,
Mechanization and Munitions, Buildup for War

Organization

In 1919 the Canadian Ordnance Corps (COC) was renamed the Royal Canadian Ordnance Corps (RCOC) in recognition of outstanding service during World War One.[17] At the same time the corps was reorganized into two branches, one for stores and one for mechanical engineering, with the stores branch having the main responsibilities for administration.[6] With the reorganization came a change of status for the IOMs who were now to be known as Ordnance Mechanical Engineers (OME). From 1910 to 1919 they had had honorary commissions and professional rates of pay to compensate for limitations in the scope of command. As OMEs, they were regular Ordnance officers with no special pay rates.[9]

The reorganized Canadian Ordnance Corps had twelve Permanent Active Militia detachments spread across the country from Esquimalt to Halifax. Of these, six had ordnance workshops. Later, in 1936, as part of the reforms of the reserves at the time, several Non-Permanent Active Militia (NPAM - the reserve force) ordnance workshops were also formed. (See Appendices 1 and 2). There was another reason for forming the reserve workshops. The Chief Ordnance Mechanical Engineer at the time, Lieutenant-Colonel N.C. Sherman, had urged that Canada follow the British lead and establish a system separate from the ten current services in order to cope with the increasingly mechanized force. The first unit this program would be tried out on was to be a reserve unit.[18] The system was based on the concept of workshop vans for mobile workshop repairs. Colonel Sherman was trying to reinstate the idea of the successful mobile workshop of World War One.

OMEs and Tiffies

Until 1933 there were only three OMEs in the PAM, N.C. Sherman, G.E.J. Ball and J.N. Gibson. Each was responsible for several detachments; Sherman for Central Canada (Ontario and Québec), Ball for Eastern Canada (the Maritimes) and Gibson for Western Canada (the Prairies and British Columbia). Colonels Gibson and Ball were two of three artificers who had been commissioned as IOMs during World War One.

Commencing in 1933 more OMEs joined including; R.L. Franklin (later the first Officer Administering the Corps of RCEME), M.P. Jolley (from McGill), E.C. Mayhew (the first RMC graduate to become an OME and later a Superintendent of AEEE, a forerunner of LETE), C.W. Jones (later Commanding Officer 202 Workshop Depot and Commandant of the RCEME School), P.C. King (later Head of Mechanical Engineering at RMC) and C.M.R. Elmsley (from Queen's) and three more RMC graduates, K.H. McKibbin (later Director General of Ordnance Systems), H.L.K. Mason and K.R. Ward (later DEME).

On entering the Canadian Army these young OMEs spent a year or two in a region under a senior OME. They were then sent on a two-year OME course at Woolwich Arsenals in the UK followed by a year at various units in the UK. On their return they were to be employed in one of the regions but, since World War Two was imminent, some went to specialized areas. For example, M.P. Jolley had specialized in small arms while in the UK. Hence, in 1939 he was seconded to the Bren Gun factory (Department of Munitions and Supply), where he remained for his whole service (see page 79). R.L. Franklin had specialized in mechanization, was employed in the design of the Canadian Military Pattern (CMP) vehicles used in World War Two (see page 79) and initiated much of the work on the original workshop vans of World War Two.[19]

During the 1930s there was a waiting list for the few artificer positions. One had to be a qualified journeyman tradesman and pass a stiff trade test before one was accepted as a Private, provisional Staff-Sergeant. On acceptance, usually at the age of from 30 to 40 years, the recruit artificer worked in a workshop under a senior artificer. To qualify for confirmed rank, he had to attend courses for a year-and-a-half at Woolwich Arsenals in the UK, followed by six months in British units various other arsenals, etc. Usually the recruit artificer had to wait five years for a vacancy for the qualifying program in the UK.[20]

17. *RCOC Standing Orders*; 1965; page 17.
18. Bradford, LCol J.K.; *Twenty Five All Ranks NPAM to UK*; unpublished article, 1980; page 4.
19. McKibbon, Brig K.H.; taped interview with the author, 1975; location A580.
20. Lodge, Maj L.; taped interview with the author, 1975; location B34.

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Workshop Life

During this period the ordnance workshops were responsible for the repair of guns, small arms, instruments, tents, barrack furniture, vehicles and field telephones. The repair of wireless equipment was the responsibility of the Royal Canadian Corps of Signals. A workshop section of an Ordnance Detachment RCOC, therefore, might have a gun shop, an armourer's shop, a carpenter shop including wheelwrights, a blacksmith shop and a tent and textile shop.

The life of an OME or an artificer (commonly referred to as a tiffy) was varied. In Central Canada the tiffies worked in their home district workshops and the OME toured the region inspecting the equipment during the winter. During the summer all were concentrated at Camp Petawawa to operate a workshop in support of the militia summer camps. The OME went up to Petawawa in mid-May to open up the shop with the artificers. The camp would run from the first of June to the end of August. Then the workshop would be closed, put in mothballs and the OMEs and tiffies would return to their home districts for the winter inspections.[21]

"Much of our work was with the PPCLI who were located at Workpoint Barracks," noted Sergeant G.L. Evans, who joined the RCOC(E) in 1932 in the workshop at the Dockyard.[22,23] As an apprentice-machinist he had joined the army for job security at the start of the Great Depression. He remained at the workshop until the war started in 1939, progressing to the rank of sergeant. All his training was on the job. "It was interesting work." he recalled. "We were responsible for rifles, machine guns, etc, and band instruments. Replacing the heads on drums and pounding dents out of bugles made an interesting change in life!"

"There were also a number of projects involving equipment updating," recalled Staff-Sergeant J.H. Bourne, "In 1936/37 we converted the running gear of 18-pounder guns and limbers to pneumatic tires. This was the Martin-Perry Adapter program. I worked out of 3 Detachment RCOC in Kingston and did the guns in Eastern Ontario and the Eastern Townships of Québec. The next year on Barriefield Hill we tested modified equipment towed by a Cardon-Lloyd carrier. That summer there was the usual firing on the ranges at Petawawa. In the winter of 1937/38 we carried out some firing tests on Lake Ontario just West of Kingston. Then just before the war started we removed the 9.2" coast defence guns from Signal Hill in Esquimault to Albert Head. We dismantled and moved the first gun ourselves. It took three months with our antiquated equipment. The second gun was moved by a contractor who had up-to-date heavy equipment. It took only eleven days."[24]

Training Craftsmen

In 1933 the Ordnance Training Centre was started in two locations. The "O" side was at Winnipeg and the "E" side was at Kingston under Colonel Sherman.[9] At this time the Kingston workshop was in a little one-floor shed behind the District Headquarters. In 1937 the workshop at Barriefield was built.[25] This is the original wing of the current Maintenance Company at Base Kingston. The other two wings were built circa 1941.

In 1939 the two sides of ordnance training were combined in one location at Petawawa. Soon after, in early 1940, they were moved to Barriefield to become the Canadian Ordnance Training Centre.[9] In 1941 it was renamed A21 Canadian Ordnance Corps Training Centre and Colonel Sherman was appointed Commandant.[26] On the formation of RCEME in 1944 it was renamed once again, this time to A21 Canadian Ordnance and Electrical and Mechanical Engineering Training Centre.

In 1936 the first reserve workshop, 2 Army Field Workshop (NPAM), was formed in Toronto with Major H.G. (Spike) Thompson in command and an authorized strength of 5 officers and 15 ORs. As there was no space in existing armouries, the unit had to settle for accommodation in a government building near the Yonge Street Arcade. As Captain G.W. Beecroft, the unit's 2ic, noted "We had no equipment and didn't

21. McKibbon, op.cit., location A613.
22. Evans, Capt G.L.; telephone interview with the author, 1995.
23. The building used by the workshop in the 1930s is still in use by BEME Esquimault. The PPCLI, the 3rd Battalion, only recently (1994) moved from Workpoint Barracks.
24. Bourne, Capt J.H.; letter to the author, 1995.
25. McKibbon, op.cit., location A650.
26. Stacey, Col C.P.; *Six Years of War*; Queen's Printer, Ottawa, 1957; page 553.

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even own a wrench or a screwdriver, but we did get the loan of a Vickers and a Lewis gun to instruct the men."[27]

By the summer of 1939 the unit had attained recognition as part of the Toronto Garrison and provided part of the standing guard lining the route of the Royal Visit by the King and the Queen. At summer camp that year, the unit assisted in the trials of the four-wheel-drive vehicles then being considered for use in the Canadian Army. As Lieutenant J.K. Bradford, a graduate engineer and member of the unit, noted "We had to begin by forcing a track through the underbrush to use for our trials. Then we took the vehicles out with regular halts so that we could wiggle under the machine to take the temperature of its differential."[28]

Mechanization and Munitions

During this period the amount of money appropriated for defence was so small that it was scarcely possible to replace worn-out equipment - usually World War One vintage - let alone build up new stocks.[29] Nevertheless, a start in mechanization was made. The Directorate of Mechanization and Artillery (DMA) was formed in the Master General of the Ordnance (MGO) Branch with Colonel N.O. Carr as director. The directorate included at least one OME, Lieutenant R.L. Franklin (see page 9). One of the responsibilities of the directorate was the development and acquisition of vehicles suitable for military field operations.

In late 1934 the horse artillery was issued with Leyland 6 x 4 trucks as gun tractors for the World War One horse-drawn 8-pounder guns and limbers. It is interesting to note that soon after, when King George V died, the battery in Winnipeg was called out to fire a salute. It was a bitterly cold morning and the new vehicles wouldn't start right away. Eventually one was started, by being towed by a horse-drawn wagon. Then this vehicle was used to start the others, recalled Sergeant R.W. Lawson, the unit's mechanic.[30] Cold weather starting was an early problem of mechanization!

By 1938 the artillery also had Crossley trucks and Ford convertibles as personnel vehicles. But there was little else. For other mechanized training (i.e. armoured and machine gun) there were only a few Carden-Loyd Machine Gun Carriers bought in 1930 and two Vickers Mark 6 Light Tanks purchased in 1938.[31]

In 1935 the British government had asked for information on Canada's potential for munitions production. The Canadian government was not keen on the idea and although many companies were interested and capable, only a few contracts were let. One, let in 1937, called for 12,000 Bren guns to be manufactured by John Inglis Company; 7,000 for the UK and 5,000 for Canada.[32] These were the first military small arms to be manufactured in Canada since World War One. The contract helped to re-establish an industry. {But the Canadian auto industry was overlooked.}

Because most Canadian officers in the 1930's had had some British training, the Canadian Army wanted trucks of British design, proven and "worked out" by the British War Office but adaptable to Canadian production. Colonel Sherman, however, wanted a Canadian military truck. Therefore, in 1937 Ford of Canada responded to a request from DND by designing the first "Canadian Military Pattern" prototype vehicle. It was built on a strengthened one-ton Ford V8 truck chassis with special hubs to fit British cross-country tires and rims. By the next year GM was prototyping a similar vehicle. By the summer of 1938 Ford-Marmon-Herrington had produced an all-wheel 6 x 6 drive truck for testing.[33]

The manufacturers would have preferred to produce more conventional trucks but DND insisted on special military models. This was fortunate because, although no vehicles got beyond the prototype stage, some experience had been gained so that when war started production lines were set up and operating within a year.

Buildup for War

As war clouds again loomed, the buildup for war increased. The mechanization of the army progressed and by 1939 DMA had become a ten-man directorate which included Lieutenant J.R. Dunlop

27. Beecroft, Col G.W.; transcript of interview with LCol R.A. Hodgson, 1962 and as amended with Colonel M.C. Johnston, 1978; page 1.
28. Bradford, op.cit., page 6.
29. Goodspeed, LCol D.J.; *The Armed Forces of Canada 1867-1967*; Queen's Printer, Ottawa; 1967; page 95.
30. Lawson, WO1 R.; conversation with the author, 1959.
31. Gregg, Dr W.A.; *Blueprint for Victory*; Canadian Military History Society Inc, Rockwood, Ontario, 1981; page 171.
32. Eayrs, James; *In Defence of Canada - Appeasement & Rearmament*; University of Toronto Press, 1965; page 120.
33. Swallow, Sid; quoted in Gregg, Dr WA; op.cit., page 4.

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(later Colonel and DEME).[34,35] Meanwhile, the Engineering Branch of RCOC expanded more and more until it amounted to a separate organization in the Corps. Colonel Sherman had become Chief Ordnance Mechanical Engineer (COME) in 1937 in addition to his Central region duties. In 1939 he was moved to Ottawa as full time COME. Shortly after, a half dozen senior artificers were commissioned as Assistant OMEs, the first time this had happened since World War One.[3,35] At the same time the gunners, tankers and truckers were expanding their own repair organizations[9] causing duplication and shortage of tradesmen, parts and tools. Committees began to investigate the problem. Their recommended changes came soon.

34. Wolff, L.H.; collected papers, notes on DVSA.
35. RCEME Quarterly 4/4; page 2.

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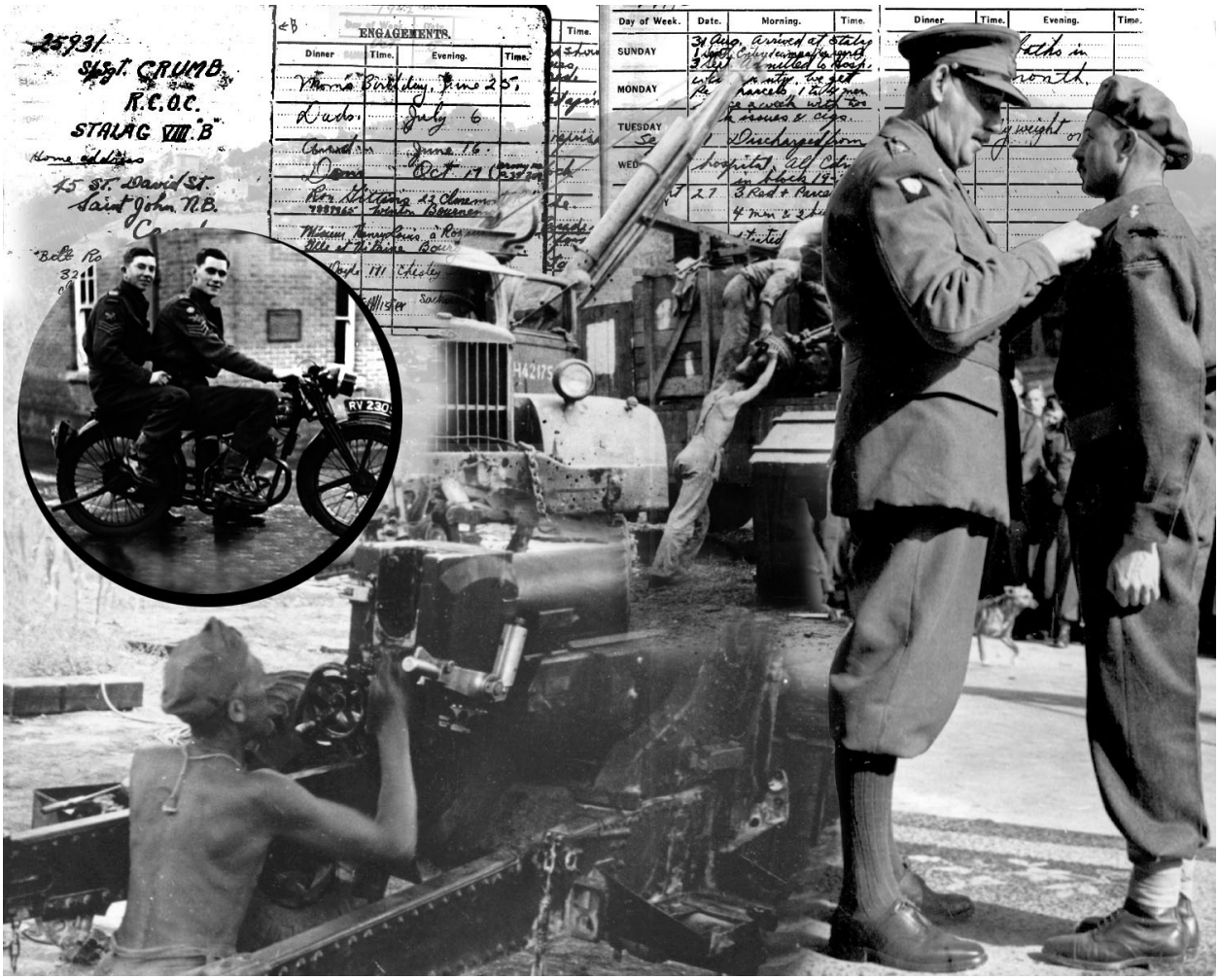
WORLD WAR TWO

The "blitzkrieg" of May 1940 unleashed on the world a quantum jump in escalation of violence and warfare. The allies were not prepared for this "materialenschlacht" which, increasingly and rapidly, became the form that fighting took in the Western world.[1] The might of materiel had transcended the might of man.

It was to be the crucible in which RCEME was born. Canada's Craftsmen were called to the fore - as soldiers, as technicians and as engineers.



Montage, clockwise starting top left - Two soldiers on a motor cycle *S/Sgt R.E. Crumb*; workshop spare parts section- Diamond-T wrecker used for heavy lift. *Maj C. Martin*; repairing a field gun. *Maj C. Martin*; award of the Military Cross. *Maj J.C. Armstrong Family; background* - S/Sgt R.E. Crumb's diary as a POW 1942-45 after Dieppe. *S/Sgt R.E. Crumb*; workshop deployed in the field. *Maj C. Martin.*

1. Chalfont, Alum; *Montgomery of Alemein*; Weidenfeld & Nicolson, London, 1976; page 334.

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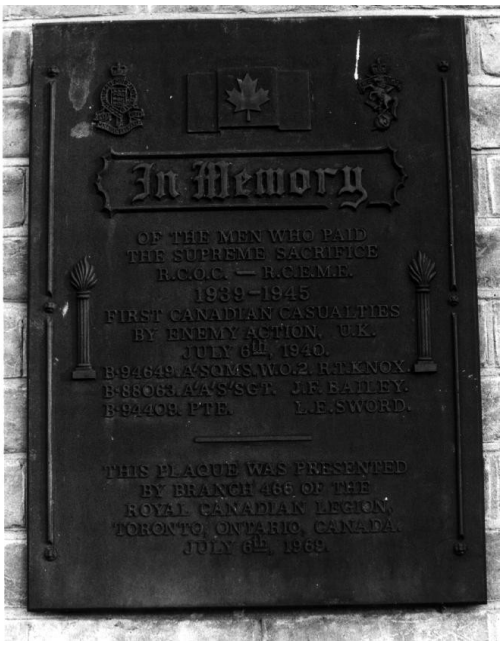

Plaque commemorating the first Canadian Army fatal casualties due to enemy action in the United Kingdom in World War Two. The plaque is located at Headquarters SouthEast Command, Aldershot Barracks near where 2 Army Field Workshop was bombed on 6 July 1940. *DND.*

Officers of 2 Army Field Workshop, 6 June 1940. The workshop had just been alerted for a possible move to France to form a Second Front. *DND courtesy LCol A. DeMaio.*

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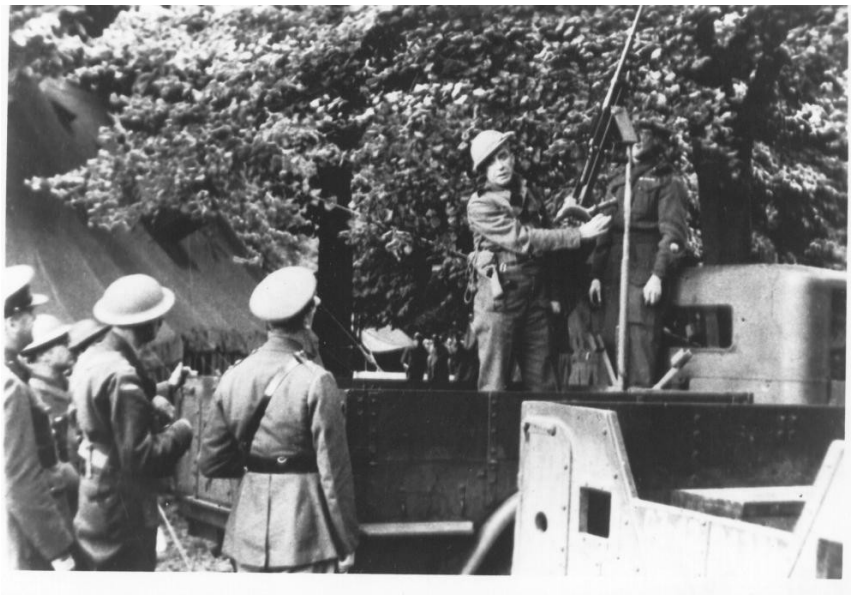

First Line of Defence - summer 1940. After Dunkirk to meet the needs of light low-level air defence in Southern England, 2 Army Field Workshop designed and built several hundred high-angle machine gun mounts for installing on light vehicles. Major G.W. Beecroft demonstrates one for the Duke of Gloucester in Ladas Park, Kent. *The late Col G.W. Beecroft.*

Training for war - an OME Course for newly arrived Canadian graduate engineers - England circa 1941. *2nd row third left* Lieutenant D.S. Holmested who later won the Military Cross posthumously at the Battle of El Alamein. *fourth left* Lieutenant (later Major) R. Johnson who, as CO of 9 Infantry Brigade Workshop, was later killed in Normandy shortly after D-Day. *DND courtesy LCol A. DeMaio.*

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Major-General A.G.L. McNaughton, GOC 1st Canadian Infantry Division, inspecting a 20mm Hispano-Suiza modified for light anti-tank role by 2 Army Field Workshop - summer 1940. *The late Col G.W. Beecroft.*

Left: 60-cwt CMP Wrecker - 1940s-1950s. General Motors/Ford 3-ton 4x4, Garwood (later Holmes) twin boom wrecker gear, powered winch. *Dr. W.A. Gregg*

Right: 15-CWT CMP Welding Truck (KL Lorry) in Italy. *Maj C. Martin.*

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Control Office 1 Canadian Infantry Troops Workshop. Located in the Corps Administrative area, this workshop carried out third-line repairs to 1 Canadian Infantry Division's equipment. *Maj C. Martin*.

Vehicle Painting. *Maj C. Martin*

Third-line repair and rebuild in the battle zone – 1 Canadian Infantry Troops Workshop. Rebuild line for the White 15-cwt armoured trucks. *Maj C. Martin*.

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Motorcycles. *Maj C. Martin*.

Changing a Jeep Engine in 1 Canadian Infantry Troops Workshop, somewhere in Italy, 1943-44. *Maj C. Martin.*

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Engine rebuild at 1 Canadian Infantry Troops Workshop. *Maj C. Martin*

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60-cwt CMP Radio Repair Truck (Z Lorry). *Maj C. Martin*.

2 Army Field Workshop on manoeuvres in England - March 1942 on Witley Common.

The Escapers, *right:* Staff/Sergeant R.E. Crumb who had been taken prisoner at Dieppe in 1942) and *left:* friend (with Mauser), beside the Opel staff car they took from a German Officer after their escape from a POW camp in April 1945. *S/Sgt R.E. Crumb*.

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Left: Motor Cycle Dispatch Rider from RCEME Headquarters, 1st Canadian Army Troops - somewhere in the UK. *Unknown*

Right: Award of the Military Medal to Artificer-Staff-Sergeant T.M. Monteith from Lieutenant-Colonel A. DeMaio, CREME 1st Canadian Division. *LCol A. DeMaio*

Above, left and right: The way we get them - The way we fix them. Creating awareness of RCEME - somewhere in Northwest Europe 1944/45. *DND, DND.*

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Visitors to 1 Canadian Infantry Troops Workshop - somewhere in Northwest Europe. "Sadie", the statue, had been picked up in Italy and, placed outside of the Control Office tent, quickly became the workshop's identifier. *Maj C. Martin*

Offloading a heavy RCEME wrecker - Mack 5-ton 6x4 with Garwood 16-ton twin boom wrecker gear and rear mount 20-ton winch - Normandy summer 1944. *DND courtesy Dr W.A. Gregg*

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Top: Recovering a Universal Carrier from the mud in Holland 1945. *Unknown*

LAD officers of 3rd Canadian Division in Normandy soon after D-Day. *left to right front* - Captain D.C. Little, Captain H.G. Ambrose, Lieutenant L.G. Marks, Captain G.R. Currie, Captain W.T.E. Duncan; *rear* - Captain J.H. Bourne, Lieutenant F.B. Munroe, Captain J. Stone, Lieutenant R. Evens, Captain W. Mills, Captain L. West, Captain T. Hastings; missing -Captain D.C. Little, Captain Greer. *LCol W.G. Hamilton*

Recovering a Sherman tank near St-Leonardo, Italy in 1943 using a D-8 Caterpillar Tractor with winch. *DND*

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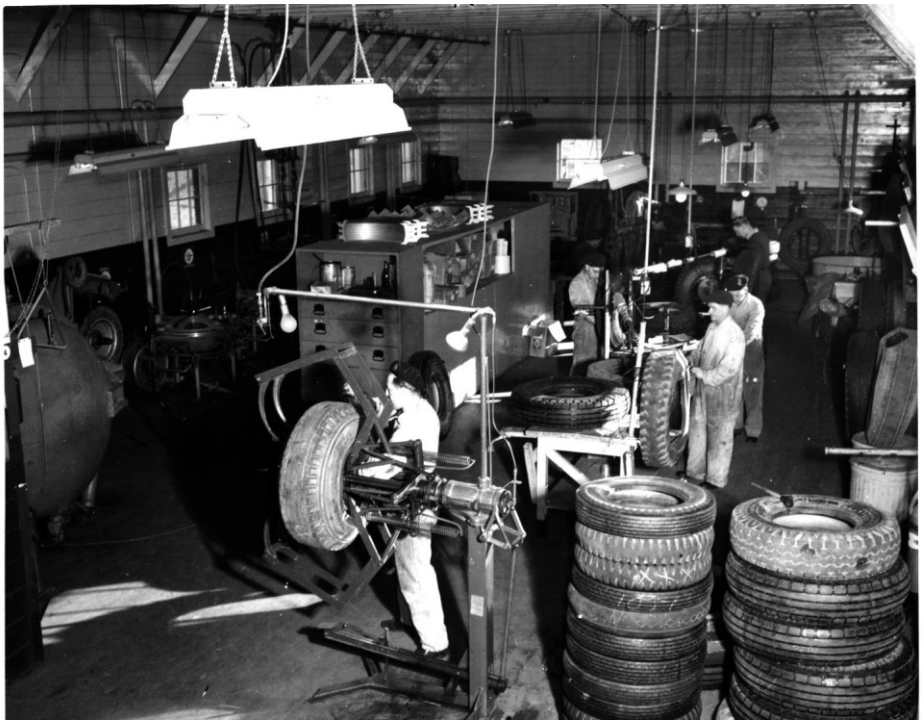
A RCEME Armourer assists in taking German Prisoners somewhere in Normandy - summer 1944. *DND*



Tire Recapping Unit, Pacific Command. One of several specialist units set up in World War Two. *DND.*

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2

Chapter 2 - MOBILIZATION, PREPARING THE SECOND FRONT

Mobilization, Preparing for the Second Front

"1939 was a year of concern. While nobody could quite believe that the Canadians would go to active war, the actual declaration of war was a very real shock to those of us who had received mobilization notices in August," wrote Lieutenant J.K. Bradford when 2 Army Field Workshop (2AFW) was mobilized in 1939.[1] *It went overseas in January 1940 as part of the Canadian Active Service Force (CASF).*

The war after the war to end all wars had been declared.

Mobilization

The eve of World War Two found Canada, like many of her allies, trying to make up for years of neglect in manning and equipment. Re-equipment and mechanization were in progress and many units had been mobilized. However, they were trying to prepare for the trench warfare of thirty years before.

Manning was very slow and the massive influx on mobilization did not cater for the allocation of trades skills. This led to deficiencies in the technical corps and factories. To get the optimum utilization of technical manpower much reorganization was required.

The basic concepts for the repair and recovery system had evolved during World War One and included three lines of repair; LADs attached to units, mobile workshops at divisional level and lines of communications workshops.[2] However, the organizations and establishments were geared for the semi-static trench warfare and lesser degree of mechanization of World War One.

The only equipment available was personal equipment and rifles. Other equipment including guns was obsolete and would have to be obtained from manufacturers in Canada or the United Kingdom.[3]

Mobilizing the Canadian Active Service Force (CASF)

On 1 September 1939, with the guns already firing in Poland, the Department of National Defence issued a General Order authorizing the immediate organization of a CASF of two divisions with a proportion of ancillary troops.[4] The ancillary troops included two Army Field Workshops (AFW), one for each division, each with an establishment of 32 officers and 750 other ranks organized into a Main Shop, three Recovery Sections and seventeen LADs.[5]

On September 28 it was confirmed that 1st Canadian Division would be sent overseas. "There were to be armourers at Brigade headquarters and unit armourers," noted Sergeant G.L. Evans. "When war was declared the senior armourers in the workshops across Canada were promoted to Warrant Officer (Class 2) and assigned to Brigades. I was with 2 Brigade in 1st Canadian Infantry Division. We went overseas in the fall of 1939 and by Christmas were in Surrey. I had a staff of four armourers. We were responsible for repair of all the weapons in the Brigade."[6]

2 Army Field Workshop (2AFW) of Toronto was selected to go with 1st Division. The reason, noted Major G.W. Beecroft, the unit's second-in-command, was that 2AFW was the best-organized and best-

1. Bradford, LCol J.K.; *Twenty-Five All Ranks NPAM to UK*; unpublished article, 1980; pages 6-13.
2. *Ordnance Manual War 1939*; The War Office, Sep 13, 1939; page 129.
3. Stacey, Col C.P.; *Six Years of War*; Queen's Printer, Ottawa, 1957; page 62.
4. Stacey, Col C.P., (editor); *The Development of the Canadian Army*; Introduction to Military History, 6th edition, 3rd revision; pages 3-4.
5. Beecroft, Col G.W.; transcript of interview with LCol RA Hodgson on 7 March 1962 and as ammended with Colonel M.C. Johnston, 13 June 1978; pages 2-5.
6. Evans, Capt G.L.; telephone interview with the author, 1995.

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equipped of five similar units across Canada. He also recalled that it didn't have a screwdriver or a spanner and only had five officers and twelve ORs! Yet within four months the unit was almost up to strength and on its way overseas.[5] It was a sad reflection on preparedness as a nation. Yet it is also typical of how Canadians as individuals flocked to the colours when called.

Recruiting posed its problems. Due to the Great Depression and lack of an extensive apprenticeship program it was difficult to find the required tradesmen such as welders, blacksmiths, fitters, etc. 2AFW had to take older men, up to the age of 40. Soon half of the old soldiers in Ontario were trying to enlist.[5] On 15 September, 2AFW was ordered to stop recruiting. Other units across Canada had filled up quickly leaving a surplus of volunteers, many of whom Ottawa felt had qualifications for the unit. Lists were reviewed and the surplus absorbed. By late November 2AFW started recruiting again. There was a decided lack of properly-qualified tradesmen suitable for employment in the unit. The ratio of acceptable recruits to volunteers was one to eight.[7] Although the unit was nearly up to strength by Christmas, much training was required before the unit got to England.[5]

2AFW was accommodated in the Horse Palace at the CNE grounds in Toronto. As a barracks it was suitable for equine guests, recalled Captain J.K. Bradford and it took a lot of work to fit it up.[5] In the search for tools and training aids to conduct trades training the unit found some old military equipment stored in an old building nearby. The building was full of World War One harness, a few wagons and a dismantled 18-pounder with its spring recuperator in pieces over all over the floor.[7] A heaven-sent teaching opportunity!

The unit was also called on to conduct some equipment tests including acceptance trials of an electric motorcycle for army dispatch riders. But the battery was too bulky and, when on the second turn in front of the distinguished spectators, the vehicle twitched slightly, the driver's foot slipped off the brake and the machine crashed into a fence.[5] It was the end of that test.

Recruiting and trades training continued apace and by Christmas the workshop had settled into a routine. A Christmas party for families was held in Fort York Armouries and a Christmas dinner was prepared for men celebrating their first Christmas in the service of their country.[7]

But the routine soon ended. One weekend evening in early January 1940, Captain Bradford was telephoned at home and ordered to board a train for the east coast the next day. He and five other officers were to attend the Ordnance Mechanical Engineers Course in England.[8]

The 26 remaining officers and 660 men sailed from Halifax on HMS Acquitania on 30 January 1940 bound for Scotland as part of 1st Canadian Division. 2AFW was off to war and other units soon followed. However, their equipment waited for them in England because Canadian industry was not yet on a war footing.

Expanding the Army

1 Army Field Workshop was mobilized in September 1939 and was assigned to 2nd Division. Recruiting and equipping was slow that fall because priority had to be given to 1st Division. By the spring of 1940 the unit was still in London and, as the first new Canadian Military Pattern (CMP) trucks were coming off the production lines at Windsor and Oshawa, unit personnel were busy all that summer either delivering them to Army Centres as far away as Québec or assembling bodies on the chassis.[9] In September the unit was warned for overseas and on 14 December 1940 it set sail for the UK.

1 Ordnance Workshop Company (RCOC) was the third NPAM RCOC(E) unit to be mobilized in the fall of 1939. By the end of the year the unit was still quartered in Kingston. The men were employed overhauling 60-pounder guns of World War One vintage in the Barriefield workshop.[10] In the spring of 1940 the unit was moved to Borden. That summer it received over a hundred of the new CMP vehicles which had to be assembled. Unit tradesmen were also employed in maintaining the 265 World War One Renault tanks which had been purchased from the USA, delivered that summer and used as training vehicles.[11] In the fall of 1940 the unit became 3 Army Field Workshop (3AFW) and assigned to 3rd Division. That winter the division moved to Camp Debert and in the summer of 1941 was dispatched overseas. 3AFW sailed in two

7. War Diary of 2 Army Fd Wksp; quoted in Hodgson, LCol R.A.; *The Corps of RCEME - A History to 1 Oct 1946*; 1963; page 13a.
8. Bradford, op.cit., page 14.
9. War Diary of 1 Army Fd Wksp; quoted in Hodgson, op.cit., page 2.
10. War Diary of 3 Army Fd Wksp; quoted in Hodgson, op.cit., page 30.
11. Gregg, Dr W.A.; *Blueprint for Victory*; Canadian Military History Society Inc, Rockwood, Ontario, 1981; page 174.

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groups leaving July 25th and September 15th.

4th Division's workshop was formed from two Montréal-based NPAM units, 3 Army Field Workshop and 1 Anti-Aircraft Group Workshop. These two units were mobilized in October 1940 as 4 Army Field Workshop (4AFW). Before the unit sailed for England in 1942 with the division which had been redesignated from infantry to armour earlier that year, it had undergone several name changes and reorganization into discreet Light Aid Detachments (LAD) and brigade workshops to comply with the reorganization then going on in the UK.[12]

Of the five original divisional Ordnance workshops formed in the 1939-40 period, four (the workshops noted above) were formed from parent (NPAM) units and hence had a base from which personnel could be drawn.[13] 5th Division's workshop, however, and 1st and 2nd Armoured Brigades' workshops were formed at Camp Borden. They evolved from 1st Armoured Division Workshop which had been formed in October 1940. At that time Colonel (later Major-General) Worthington was assembling 1st (later 5th) Armoured Division at Camp Borden and he asked for the formation of an RCOC workshop for an armoured brigade or division. The division was later expanded to form another two brigades which were to be independent armoured brigades. The original workshop was consequently reorganized and expanded to provide the three workshops. 5th Armoured Division, along with its divisional workshop, went overseas in October 1941. 1st Army Tank (later 1st Armoured) Brigade went overseas in 1941 and 2nd Armoured Brigade followed in 1943.[14]

Like 5th Division's workshop, other workshops such as third-line workshops and rear area workshops were made up as required from drafts and designated camps.

By 1941 Canada's army in the UK had grown to 124,000 and by the time of the Normandy Landings on D-Day this number had doubled. But for most soldiers there was a long wait before they got into action.

Mobilizing Industry

It is one of the tragic ironies of history that war, which ruins millions and causes economic confusion, also brings great wealth to a limited few. As a result of World War One, there were so many war millionaires that public opinion was thoroughly aroused. Canadian opinion was solidly against war profiteering and many subscribed to the view that the profits from the manufacture of armaments should be rigidly controlled. Consequently, on the eve of war in June 1939, the Defence Production Board was formed with exclusive power to enter into contracts for the purchase of munitions and the construction of defence projects. But the regulations involved the establishment of complicated routine procedures and endless delays which greatly handicapped the purchasing organization.[15]

Consequently, on September 15, the Wartime Supply Board was formed with wider powers. The need for still greater freedom of action and authority became clearly evident and on April 9,1940, the Department of Munitions and Supply was formed to develop production capacity and capability and to acquire and allocate resources.

By the summer of 1940 in the aftermath of Dunkirk, Canada had to become a prime supplier of munitions. Soon the orders flooded in as Canadian industry had to equip not only Canada's expanding army in the UK but her allies as well.

War with Japan

The Japanese attacked Pearl Harbour on 8 December 1941 and Canada declared war on Japan soon after. "We were kept busy," recalled Staff-Sergeant J.H. Bourne, "in setting up guns commanding the approaches to our West Coast. We mounted 6-inch guns in places like Mary Hill (on the South of Vancouver Island), Stanley Park and Point Grey (in Vancouver) and 4.7-inch guns on York Island covering Johnson Straits halfway up Vancouver Island. It was all part of the Japanese scare at the time."[16]

Hong Kong. For the 1,975 men of "C" Force, the Winnipeg Grenadiers, the Royal Rifles of Canada and headquarters troops, the wait to get into action was short. They sailed for Hong Kong on two ships on

12. War Diary of 4 Army Fd Wksp; quoted in Hodgson, op.cit., page 42.
13. War Diary of 1 Armd Div Wksp; op.cit., page 334.
14. Stacey, Col C.P.; op.cit., page 191.
15. Kennedy, J. de N.; *History of the Department of Munitions and Supply*; 2 Volumes, Kings Printer, 1950; Vol 1, pages 3-5.
16. Bourne, Capt J.H.; letter to the author, 1995.

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27 October 1941. The force was fully-equipped with armament at contemporary scales except for anti-tank rifles and ammunition for 2- and 3-inch mortars.

The equipment for the force included 212 vehicles, mainly Universal carriers and ¾-ton trucks. There was no room on the troop ships for the vehicles so they were shipped on an American freighter on 4 November, a week after the troops had sailed. The freighter was routed by Honolulu and Manila arriving at the latter on December 12th. This was four days after the attacks on Hong Kong and Pearl Harbour had begun. As a result the Canadians did not receive their vehicles. They were plunged into action without their full equipment.[17]

"C" Force included several RCOC vehicle mechanics. They were the first of Canada's Craftsmen to be in action against the enemy in World War Two. One of them, Corporal P.M. Cusson, died as a Prisoner of War in Hong Kong on September 24th, 1942 and is buried there in Sai Wan Military Cemetery. (As part of the EME Honour Roll project (see 292) (see Chapter 20) his gravesite was visited by a member of REME in 1994.

Preparing for the Second Front

On arrival in the United Kingdom, 1st Canadian Division was designated to join the British Expeditionary Force (BEF) in France during the spring of 1940. Dunkirk changed all that. By June 1940 the division found itself the nucleus of the counter-attack force defending the UK. But the invasion never came and gradually, as the Canadian Army built up, training and planning shifted to the forthcoming Second Front. Availability of equipment for training and operations was an important consideration. Special efforts were made for equipment assembly and repair. In late 1941 a Canadian Base Workshop was formed. In August 1942, a reconnaissance in force was mounted by the Canadians on Dieppe. In January 1943 the RCOC(E) was completely reorganized to conform to the new British REME organization. Then, as one division and, later, another left for Sicily and Italy, the final preparations for the D-Day landings began in earnest.

Arrival of the CASF

2 Army Field Workshop RCOC (2AFW), the divisional workshop of 1st Canadian Division, arrived in Scotland in early February 1940.[7] Training started in earnest immediately. Officers left for technical courses at the Military College of Science. Tradesmen were sent on courses to various parts of the country such as RAOC Training Establishment in Portsmouth for gun mechanics, CAV Ltd in Acton for auto mechanics and Leicester School of Technology for instrument mechanics. Army units, civilian factories and technical schools all helped to give Canada's civilian technicians a background in the repair of military equipment.[5]

By May some of the workshop equipment for the unit began to arrive. The unit, on paper, was divided into many sub-units; a main shop, three recovery sections and seventeen LADs.[7] In the event of operations, these LADs were to be attached to fighting units. However, because of the absence of so many officers and NCOs on courses, personnel of 2AFW had never been informed of their dispositions or called out and paraded as such. Then the crisis of Dunkirk occurred. 1st Canadian Infantry Division was alerted for a possible move to France to form a Second Front.

On the evening of 6 June 1940, Major G.W. Beecroft, the Acting Commanding Officer of the unit in the absence of Lieutenant-Colonel H.G. Thompson who was on course, paraded the workshop for a unit photograph after which he read out the assignments to sub-units. There was utter confusion - many wanted to be with their pals, some were reported to be deficient in their trades and, worst of all, many were still away on courses. It took several hours to straighten up the matter. Men were assigned to Light Aid Detachments (LADs) and duly dispatched to their units for embarkation to France.[5]

In the end only 14 LAD, commanded by Lieutenant J.G. Pope attached to 1st Divisional Signals, landed in France, arriving at Brest on 13 June and returning to England the next day.[7] This was the first RCOC(E) unit on the continent in World War Two. Other units such as the Toronto Scottish and 1st Canadian Field Regiment, which had LADs and which went to France, only took some unit

17. Stacey, op.cit., page 448.

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fitters/armourers.[18] The remainder of the divisional workshop remained at Northampton where it had moved after setting up tents at Aldershot for the survivors of the BEF.

The first machinery lorries for the unit arrived as the unit moved back to Aldershot and then to Epsom where the work to repel invasion began in earnest. During their stay at Epsom, a warm relationship between workshop personnel and their hosts sprang up. This was commemorated in 1951 by a ceremony when eight benches for Rosebury Park were presented by the former officers of the unit. At the ceremony Colonel G.W. Beecroft recalled, "Those were happy days, but also eventful and grim because invasion was expected at any moment and we were ill-prepared for what might come."[5]

Threat of Invasion

The gloom of Dunkirk hung over England that hot summer of 1940. An army had been rescued; but its equipment had been lost. Invasion threatened. There was need for courage. Britain's military position was well-nigh desperate. 1st Canadian Division was now, in terms of training and equipment combined, the strongest element in a very weak fabric.[19] Consequently, the division was organized in brigade and battalion groups constituting mobile columns capable of rapid and flexible action and assigned to a principal role of defending against airborne assault anywhere in England. Their commander, Major-General A.G.L. McNaughton, described them as a mobile reserve with a 360-degree front which might have to operate anywhere in England.

But was their equipment suitable for the attack and tactics expected? Defence against blitzkrieg-style warfare had created new requirements for light anti-aircraft guns, troop-carrying vehicles, and light, swift, off-road vehicles mounting machine guns. There were none available and time was of the essence. Therefore, General McNaughton set his divisional workshop to work trying to find remedies by improvisation in short order. It was to be equipment design and production in the field for the 700-man workshop.[7]

The British Expeditionary Force (BEF) had found, at great loss, that their long convoys on the straight highways of France and Belgium were sitting ducks for German dive bombers. Accordingly, divisional establishments were changed to include light anti-aircraft guns. The Canadians, however, didn't have light anti-aircraft guns although they had Vickers guns, Lewis guns and some Bren guns. They were dependent entirely on small arms, but there were no mountings or sights for high-angle fire that could be swung around rapidly. Consequently, 2AFW was ordered to design a mounting which, in addition to being adaptable to all three types of machine guns, could be installed on trucks. After some trial and error, a mount was developed made of pipe and steel plate. Although not established for mass production, the workshop manufactured about 500 of these mounts.

At the time, late July 1940, 2AFW was located under the chestnut trees of Lord Rosebury's estate near Epsom. Since it was an RCOC unit, one could literally say that "under the spreading chestnut trees where the village [workshop] smithy stands" these anti-aircraft gun mounts were forged!

The Vickers gun was not equipped for high-angle fire because its belt would jam. The workshop had to design and produce a special basket and guides to overcome this problem. In addition, since the Canadian machine guns had fine sights which were of little use against fast-moving aircraft, the workshop designed special wire sights, just a segment of a half-circle but all that was needed to track a plane. They made and installed hundreds of these sights.[20,21]

The mandate to operate "anywhere in England" required troop-carrying trucks. At the time, trucks did not have troop-carrying facilities. All the soldiers could do was stand up or sit on the floor. 2AFW designed and built lateral seats that could be collapsed on hinges so that the truck could be used for both cargo and troop-carrying. The workshop fitted hundreds of trucks with these. Obtaining the necessary materials was the real trick, however, as lumber was under strict control. It took months to get projects approved and lumber delivered. However, the workshop had learned that vehicles from Canada were arriving at Southampton crated in heavy lumber. A quiet word with Canadians at the dock solved the problem in a day. Hundreds of trucks were fitted out in short order.[20]

During the Blitzkrieg in France, havoc had been created by the hit-and-run tactics of the German

18. Lawson, WO1 R.; discussion with the author, 1959.
19. Stacey, op.cit., page 18.
20. Beecroft, op.cit., pages 9-11.
21. Stacey, op.cit., page 290.

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"fighting motorcycles": motorcycles fitted with side-cars on which machine guns were mounted. These could be extremely useful in the mobile defence role assigned to the Canadians. Therefore, special reconnaissance squadrons, one for each of the three brigades, were formed. Each squadron was to have about 75 or 100 of these fighting motorcycles.[20,21]

In June 1940 a shipment of motorcycles with side-cars, which had been consigned to France from the United States, was diverted to England. These, plus some English motorcycles, were sent to 2AFW to be converted into armed vehicles which, like those of the Germans, would have a cross-country capability. An English firm designed a swivel chair mount for the machine guns while the workshop built a platform on the side-car to install the mount. The workshop also modified the mount for high-angle fire and made adaptors for the three types of machine guns.

The unit, now located at Salamanca Barracks in Aldershot, worked around the clock. On Saturday afternoon, 6 July, there were 300 men working on the motorcycle project. Major Beecroft was called to the phone at 3:00 P.M. and warned that an enemy plane was approaching his area. At the same time the plane dove out of the clouds and dropped a stick of bombs. One bomb hit the corner of the parade square, where the machinery trucks were located on the edges of the parade ground partly concealed by trees, killing three and wounding thirty members of the unit.[22] These were the first Canadian fatal casualties by enemy action in the UK during World War Two. (This is commemorated on a plaque, near the front entrance of Aldershot Command Headquarters, which was presented by Branch 466 of the Royal Canadian Legion and unveiled by Brigadier-General A. Mendelsohn.) Within a half-hour of the bombing the men were at work again and worked all night. They delivered many of the motorcycles the next morning.[23]

Sneak raiders, as Staff-Sergeant M.C. Stone called them, sporadically bombed and strafed workshops particularly in the south of England. One day in early February 1943 he noted, "All day long we could hear him (German aircraft) bombing the villages around us, but not until about four-thirty in the afternoon did we get our share of it. I was standing near the gun shop when we saw this black twin-motored plane coming towards us very low. Then we saw tracer bullets coming from his tail so down we went. He passed us about one hundred and fifty feet up. I could see the markings, the Nazi cross on his side and tail quite plain and all the time he was spraying bullets as he tore along. Luckily he hit no one but there were many narrow escapes. Then just after supper another plane tried to bomb the road near the workshop. He missed."[24]

In December 1940 a Matilda Tank belonging to a British regiment was recovered and brought into 2AFW. AQMS(WO2) W.M. Dalrymple lost no time in getting to work on it.[7] In January the unit learned of the formation in Canada of 1st Army Tank Brigade.[20] Consequently, WO2 Dalrymple and a dozen of the unit's best tradesmen were attached to a British armoured formation to take intensive training on tanks. The workshop was preparing itself to support armoured warfare.

At about this time the unit's neighbouring hospital, 15 General Hospital, was in a panic. Their North American equipment could not be connected to the British oxygen and nitrous oxide bottles because of different thread sizes. Within a day, and using their war reserve of bar stock, 2AFW made the necessary adapters.[20] As part of the preparation for the Second Front this action was later extended to metric sizes used in Europe for oxy-acetylene welding equipment.[22]

Training for the Second Front

By 1942, while the Canadians continued to build up their army to a five-division organization, their training shifted from defensive to amphibious offensive operations. The workshops supported this training, reorganized their workshops and procedures, and trained for the new equipment-oriented mobile style of tactics.

Reorganization came in three stages. In late 1941 the Army Field Workshops became Divisional Ordnance Workshop RCOC and the LADs were made separate units permanently attached to the units they supported. The SOME became ADOS(E). In 1942 the RCOC(E) was again reorganized and expanded to include corps- and army-level workshops. Finally, in January 1943 the Canadian army adopted the new REME organization but retained the RCOC(E) branch name (see page 268). As of this time the ADOS(E)s

22. *REME Intelligence Note*; War Office, UK; 1943.
23. Beecroft, op.cit., pages 7 and 8.
24. Stone, Art/S/Sgt M.C.; letters to his son 1941-46, 15 February 1943.

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became CREMEs and Privates became Craftsmen. Morale soared.[25]

The essence of the new REME/RCOC(E) tactics was repair as far forward as possible. The Blitzkrieg of 1939 and Rommel's successes in North Africa had proven that recovery and repair *in situ* minimized the down-time of equipment, thereby increasing the availability of equipment critical to the conduct of the battle, e.g. guns and tanks. The success of this strategy was proved at the Battle of El Alamein (see page 34).

The rapid mechanization of the Army found the electrical and mechanical engineering service without a firm doctrine for repair and recovery under field conditions. It was mainly through trial and error in formation exercises that a policy was formulated. In 1941-42 such large scale exercises as BUMPER and SPARTAN involved virtually all formations in the United Kingdom, and assisted greatly in the development of a workable plan as they showed all too clearly the serious and urgent need for improved control at all levels. By the time that 1st Canadian Division and 1st Canadian Armoured Brigade left the UK for Sicily in July 1943, vast improvements had been made.

Armoured division exercises in Norfolk in the late summer of 1943 proved to be a good testing ground for divisional doctrines which had been developed after exercise SPARTAN in March. These exercises resulted in a much broader use of Advanced Workshop Detachments (AWDs) than had been experienced up to that time and also clarified divisional repair and recovery plans during rapid movement.[26]

Exercise HARLEQUIN, which took place on the south coast in September 1943, was devised to test embarkation procedures which would be required for the Northwest Europe assault. RCEME gained a great deal of valuable vehicle and equipment waterproofing experience through the exercise and from the Dieppe Raid, 19 August 1942.

1 Canadian Base Workshop

On 1 November 1941, Colonel G.A. Secord was given the task of organizing and commanding 1 Canadian Base Workshop (1CBW), Canada's first overseas base workshop.[27] This workshop, destined to become the largest military workshop in the British Empire, was capable of sharpening hypodermic needles for the Medical Corps or rebuilding the most complex computer then available for the artillery. From watches to tanks, from voltage control regulators to radar sets, from revolvers to anti-aircraft guns, nothing was too light or too heavy, too simple or too complex or too small or too large to be repaired or rebuilt by the staff of 2,100 in the workshop in 1943. A year later, in 1944, the strength had been increased to 3,100 in anticipation of a heavy workload from the invasion of France (see Appendix 5).[28]

In recruiting the unit, Colonel Secord was allowed to recruit a surplus, with the understanding that only the best men would be picked to fill the establishment. The balance would be used to fill in gaps in the units left behind or to form a nucleus of any Ordnance workshop formed immediately after their departure. He had probably been given considerably more freedom by DND and probably a larger budget with which to raise a unit than any other commanding officer during World War Two.

The first draft of 50 men arrived in Camp Borden on 12 November 1941. Arrangements were completed for all training centres and depots in the district to have tradesmen ready for interviews. Interviewing and selecting tradesmen was a big task. Men under instruction and training at specialist schools, such as the 475 men at the Anderson School at London, Ontario, were paraded in classes by their instructors for interview. By the end of February 1942 the unit had been built up to 2,000 all ranks.

New buildings, now in use today as part of the technical training accommodation of the School of Electrical and Mechanical Engineering (SEME) of the British Army, were constructed by the Royal Canadian Engineers for the unit at Bordon, England. By May construction was far enough advanced that the unit moved into Bordon. However, because the unit had 400 machine-tools of all types, one of the problems in completing the workshop buildings was getting authority for a permanent hook-up to the National Grid for electrical power to run the machines. The unit used temporary hook-ups for power supply from mobile generating units until September when the permanent hook-up was completed.[29]

25. *Corps of RCEME*; Queen's Printer, 1953; page 4.
26. *RCEME Operational Manual*; DND Publication, 1948; Part 1, page 2.
27. War Diary of 1CBW, op.cit., page 135.
28. *Annual Report of 1CBW*; report, 1944.
29. LORE Technical Bulletin 3/78, page 36.

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Improvements to workshop facilities and capabilities were continuous. For example, in the summer of 1943 a new engine test building was constructed. This was a great asset in the testing and rebuilding of tank engines which had to have a minimum of 400-horsepower. That fall the workshop opened up a new chrome-plating plant for the purpose of chrome-plating the cylinder barrels of the tank engines. Meanwhile, the instrument shop made a rather unique pilot model of a stapler using stainless steel staples to close incisions instead of using sutures or clips. Later this shop made another special piece of equipment for the RCAMC called a dermatome. The function of this instrument was to remove a predetermined thickness of skin from a person's body for use in skin-grafting. {There is, however, no record of the instrument mechanics testing the dermatome of their forearms as they did the stapler!}

As the buildup for invasion of France progressed 1CBW was called upon for many special tasks. In August 1943 the workshop commenced waterproofing tanks for the 5th Canadian Armoured Division which was preparing to go to Italy. In January 1944 the unit was tasked to waterproof 1,800 vehicles needed as last-minute replacements to units requiring them before the invasion of France.

Later in January came a priority demand to overhaul 87 (later increased to 117) Sherman tanks for active operations. This order was to be given priority over everything else in the tank shop. But at the same time the War Office froze the supply of Sherman spare parts in preparation for the invasion. However, by 21 February the workshop had completed 110 of the 117 Sherman tanks for the Canadians and, in addition, had processed 103 Ram tanks for the British.

The waterproofing of the assault vehicles started on 21 March. The assault units brought their vehicles to the shop where they remained until almost the last minute thus ensuring that everything was in readiness. The shop programmed itself to handle 80 vehicles a day.

The workshop also received a priority task of equipping forty 3-ton lorries with radios. However, most of the installation kit was not standard issue and had to be manufactured in the ancillary shops before the main program could commence.

On 15 May 1944 Colonel Secord attended a special ceremony marking the change from RCOC(E) to RCEME. The new War Establishment converting the rank and trade structure from RCOC to RCEME arrived on 5 June. The following day, all ranks were filled with both tension and enthusiasm on hearing that the Allied Armies has started the Second Front and 900 volunteers contributed blood to the emergency blood bank the RCAMC was building up to take care of casualties.

By August the first tanks arrived back from Europe for base overhaul. The engine rebuild rate was increased to 50 per day. By fall the shops were busy repairing and rebuilding several thousand 'B' vehicles that had accumulated in their backlog. There was no shortage of volunteers for contributions to the blood bank. The shortage of infantry reinforcements began to be felt, however, and personnel in the shops who stepped out of line were threatened with a transfer to the infantry!

At year's end 1944 an easing off of the pressure of the war effort became noticeable in the workshop. But by March 1945 the backlog began to climb. Reinforcements were still required in Europe. This coupled with the general reduction in incentive plus the start of a trickle of officers and men being repatriated to Canada placed a new strain on the workshop. However, by a tremendous effort 1CBW was able to increase its output. The statistical records for the four-week period ending 26 March showed that all production records had been broken.

Vehicle Assembly

Preliminary arrangements leading to the assembly of Canadian vehicles in England commenced shortly after the outbreak of war. Assembling vehicles in England in time of war was never an easy task for many reasons. For example, the British needed to use most of their facilities, there was the threat of aerial attack and, since vehicle components were initially shipped in bulk, there were parts shortages because of losses at sea and/or ships arriving at the wrong port. From 1941 on vehicles were shipped disassembled in crates. By the end of the war 88,000 transport and 9,500 armoured vehicles of Canadian origin had been assembled in at least 32 different locations.[30]

However, in 1940, in order to expedite the equipping of 1st and 2nd Canadian Infantry Divisions the bulk of the work was done in the Canadian Mechanization Depot. The Depot opened in May 1940 in a

30. Gregg, Dr WA; *Blueprint for Victory*; Canadian Military History Society Inc, Rockwood, Ontario, 1981.

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factory in Southampton leased by General Motors Canada from a British railway company. By November 4,200 vehicles had been assembled. Then disaster struck. On the evening of November 30, 1940 the Depot was destroyed by enemy incendiary bombs.

As the buildup of 1 Canadian Army progressed the number of vehicles assembled increased dramatically, e.g. 6,800 in 1940, 17,700 in 1942, 32,000 in 1944. By 1943 every possible location and source of labour was pressed into service. This led to the formation of 1 Canadian Equipment Assembly Unit (1CEAU) in late 1943. This unit was set up in Bordon adjacent to 1 Canadian Base Workshop[31] and included a headquarters and three shifts. The officers and supervisors were drawn mainly from 1CBW and the commanding officer was Lieutenant-Colonel Bruce McAdam, who had been a company commander in 1CBW. One shift was provided by 1 Canadian Ordnance Reinforcement Unit. Another was provided by a Transport Column (RCASC), which had three companies of drivers and its own workshop company. The third was provided by 30 (Windsor) Reconnaissance Regiment since it was available and, presumably, its soldiers were familiar with assembly work.

In one year 1CEAU assembled 8,600 vehicles. It was disbanded after D-Day and its staff sent on to other priority tasks such as reinforcements on the Continent and overhaul programs in 1CBW.

Canadian Military Headquarters

At the outbreak of war the UK was considered as a base of operations for Canadian forces. Consequently, Canadian Military Headquarters, London (CMHQ) was formed on 26 September 1939 and quickly began to function as an advance component of National Defence Headquarters. CMHQ at that time included an OME with a small staff who supplied technical advice to the DOS.[32,33]

As the Canadian forces in the UK built up, so CMHQ expanded. The OME's organization eventually became the Deputy Director of Mechanical Engineering (DDME) Branch with a DDME and staff of administrative and technical officers trained in all types of electrical and mechanical equipment in the Army. The functions of the Branch included: liaison with DME NDHQ and other nations, operation of RCEME static installations in the UK such as 1CBW, preparing and distributing overseas engineering regulations, assisting in the formation of new units and controlling the flow and training of reinforcements at 1 Canadian Ordnance Reinforcement Unit (1CORU).

Canadian Reinforcement Unit (CRU)

Of the units commanded by CMHQ, one of the most important was the CRU. Although primarily a reinforcement pool, it had the task of training new arrivals from Canada and its headquarters included an OME and three LADs - 63, 64 and 65 - which supported the nearly 1,500 vehicles used for training.[34]

One of the units of the CRU was 1CORU, formed in July 1941 with a staff of 160. In a year this was increased to 380 and doubled again as the Canadian Army built up. In the first year this unit trained or tested 9,000 tradesmen in such trades as motor vehicle fitter, armament artificer and electrician. In addition, several specialist workshops, such as 1 Radar Battery Workshop and 1 General Troops Workshop, were formed at 1 CORU which was located at Bordon Camp "just across the street from 1 Canadian Base Workshop."[35]

In July 1944, some time after the formation of RCEME as a separate corps, 1 CORU was officially redesignated 1 Canadian Ordnance and Mechanical Engineers Reinforcement Unit. A year later it was disbanded and reorganized as No. 1 Canadian Rehabilitation Trades School with a mission to help prepare soldiers for their return to civilian life.[36]

Radar Technicians

Another responsibility of CMHQ was administering the many Canadian soldiers who were on course at or attached for employment to British Army units throughout the UK. Included in this group were a number of radar technicians. In the aftermath of Dunkirk the British expended considerable effort toward

31. Maclean, Col A.L.; taped notes; location 0-96.
32. Stacey, op.cit., page 195.
33. Hamilton, LCol W.G.; *The Corps of RCEME - Historical Background*; unpublished article; page 2.
34. Campbell, Col R.A.; *Canadian Reinforcement Units 1941-43*; unpublished DND report, 1946.
35. *History of 1 CORU*; unpublished DND report, 1942.
36. Rannie, W.F. publisher; *To the Thunderer his Arms*; Lincoln, Ontario, 1984; page 103.

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improving anti-aircraft defences. Gun sites sprang up, many to be fitted with fire control radar. Trained technicians were in short supply. Therefore, assistance was sought from CMHQ.[37]

Ultimately about 20 Canadians were selected and sent on a six-week course in December 1940. The following spring they were posted to British units. Some, like Sergeant W. Edwards, a member of the heavy anti-aircraft artillery brigades in London for two years, were posted to operational units. Others, like Sergeant W.R. Willing, who was posted to an anti-aircraft division workshop near Liverpool, were sent to British army repair units.

Initially the radar equipment used was British. When a new Canadian-designed radar became available in early 1942, these technicians were recalled for training on it and then posted to 1 Canadian Radar Location Unit. However, as Sergeant Edwards noted, he had an opportunity to try one of the new, easier to use Canadian radars while still with his British unit in London.[38] His gun crew knocked down a German plane on their first try!

Lessons from the Battle of El Alamein

The Battle of El Alamein was the first test in battle of the newly formed Corps of Royal Electrical and Mechanical Engineers. General Montgomery's plan was heavily dependent on Armour which would have to cross minefields. To help assure maximum availability of this equipment, the REME plan emphasized having recovery and repair resources well forward with the front line fighting troops.

Recovery elements moved with the forward tanks. Repair elements of armoured regiment LADs were brigaded forward as first-line repair workshops on main axes of advance. As the battle started reports were at first disappointing. But this was quickly disproved. Of the first 113 tanks recovered, 66 were repaired and returned to action by the brigaded LADs.[39] Ensuring the availability of these tanks affected the course of the battle.

The importance of equipment on the outcome of the battle is exemplified in the first award of the Military Cross to a REME officer, Lieutenant D.S. Holmested, a Canadian. His citation noted: "His coolness and complete disregard for his personal safety, not only saved a valuable vehicle from falling into the hands of the enemy, but set to all ranks the highest example of courage and devotion to duty."[40] Lieutenant Holmested died from wounds received during this incident. His Military Cross was posthumously awarded. Lance-Corporal A.H. Guyton, another Canadian serving in REME, was also killed in the same action. They are both buried where they fell. Their names are included in the EME Branch Honour Roll. Their actions set the standard for the new corps and for all Craftsmen.

The Dieppe Raid

"Amidst heavy shell fire the TLC beached. The tanks rolled off one after another. They got into difficulty on the small rock shingle about twenty yards from the water. Six or seven of us followed the tanks. We crouched in the shelter of them and crawled from one to another trying to get inland but we couldn't do it." So reported Private C.J. MacDonald of 2nd Divisional Ordnance Workshop RCOC on returning from the Dieppe Raid.[41,42]

He was one of seven RCOC(E) armourers of a composite RCOC/RCASC group who landed as part of the raiding force.[43] Four returned to England.[44] One was killed during the battle on the shore. Two remained on shore and were captured.[45] One of them, Private C.S. Norman, died in captivity and the other, Armourer/Staff-Sergeant R.E. Crumb, escaped to Allied lines near the end of the war. Fifty years after the raid he returned to Dieppe as part of a Department of Veterans Affairs Commemorative Tour. He visited the Brookwood Memorial in England on which is inscribed Norman's name. In the Dieppe Canadian Military Cemetery he laid a wreath on the grave of his friend, Lance-Corporal H.W. Grear, who was the first of Canada's Craftsmen to have been killed by enemy action on enemy territory in World War Two.

37. Willing, Maj W.R.; note to the author, 1981.
38. Edwards, Sgt W.; taped interview with the author, 1982.
39. *Craftsmen of the Army*; Leo Cooper Ltd, London, 1970; page 96.
40. Baxter, B.S., Deputy Curator The REME Museum; letters to the author, 1992-94.
41. MacDonald, Pte C.J.; statement after the Dieppe raid, 1942.
42. Hamilton, LCol W.G.; *The Corps of RCEME - Historical Background*; unpublished article; page 9.
43. Rannie, W.F., publisher; *To the Thunderer his Arms*; Lincoln, Ontario, 1984; page 111.
44. Two, including Private J.H. MacIntyre, were badly wounded.
45. Crumb, S/Sgt R.E.; *Remembering Dieppe*; published in *Esprit de Corps* issues 3/6 and 3/7, 1993.

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Early in 1942 a reconnaissance in force to France had been planned in order to acquire all the information necessary before launching operations on a much larger scale. 2nd Canadian Infantry Division was selected to provide the raiding force. A small group of armourers were to be part of that force. Their task was to distribute ammunition, help with the wounded and assist in bringing back captured German arms and equipment. They came from 2 Divisional Ordnance Workshop (RCOC), the division's workshop.[46]

Armourers. Staff Sergeant Crumb recalled, "In early June the division moved to the Isle of Wight for training, especially for sea-borne landings. About a dozen of us from the Ordnance workshop practised landing with Jeeps, loaded with ammo, to be dumped at a pre-arranged rendezvous and then return to our TLC (Tank Landing Craft) with wounded. The Jeeps were fitted with three wire mesh litters. In early August, I was one of a dozen Ordnance and Engineers who were moved to a billet near Winchester. We spent about two weeks loading Bren magazines and other preparations for the upcoming raid. The Engineers made up Bangalore torpedoes and other explosive charges. It was here that I met Hank Grear and Claude Norman.[45]

"On August 18th our officer, Major F.E. Bell, told us, "This looks like the real thing. I wish I was going with you." We boarded our vehicles and moved out to New Haven where we went aboard a TLC. It carried 3 Churchill tanks, but we had no Jeeps. The men assigned to me were not on the previous raid preparations so I had to brief them on our rendezvous and possible duties. Our TLC moved out as it was growing dusk. I do not remember getting much sleep that night.

"Long before our landing craft touched the beach, we could hear firing. We were on the second wave. It was 6 a.m. and full daylight when we landed. We were constantly under fire. A shell hit our craft, knocking out the bridge and wounding the Captain in the face. Another shell hit the engine room. Another set the magazine on fire. There was more danger from shells exploding from the magazine than from enemy fire. Next, I heard Claude Norman holler to me to give him a hand with a stretcher. I jumped up and gave him a hand and we took a wounded man off the burning TLC and set him under the ramp for protection. Then we went back for more.

"Later I took my rifle and stood up in the front of the TLC by the side wall and fired at a hut up on the cliff. Claude Norman lay under the ramp and fired at a German sniper who was in the top of the Casino. We got word to one of the tanks. It fired an armour-piercing shell at the wall by the Casino window. No more sniping.

"An R-Boat (assault craft) came in to evacuate the wounded, so we began loading. It soon was so full of men that it grounded but the rising tide helped us to free it. As it pulled away from shore, it was straddled by machine gun fire. I'm not sure if anyone was hit. A soldier waved a white flag, then slowly stood up, holding the flag up. In a few minutes, some German soldiers appeared, and slowly we all started up the beach. Claude Norman and I picked up an engineer friend who was wounded in the knee and we helped him up the beach and into town. For us the raid was over."

Prisoners of War. Norman and Crumb became prisoners of war. Lance-Corporal Grear was last seen wounded and helping others at the water's edge.[47] Sadly Norman died while a prisoner. (He and Private Cusson, who died in Hong Kong, are the only known Canadian Craftsmen who died as Prisoners of War.)

"From the moment of capture, your first thought is to try to escape," noted Staff-Sergeant Crumb, "The thought possesses you day and night. You examine every possibility. Prison camp life taught me how vital discipline was to survival. Even when the water froze in the huts in winter, I would go out in the morning and wash my face in the snow, comb my hair and straighten up my clothes. We had to stay above our circumstances."

On one of his escapes he recalled that he and friend walked through the city of Dresden 10 days after it had been devastated by Allied bombing. "It took us 6 hours to walk from the outskirts to the city centre. The city still burning, houses collapsing into the streets, dead still laying about. German soldiers were watching for looters. It was scary, if the people knew who we were, we imagined being lynched. But nobody paid any attention to us, everyone seemed to be wrapped up in their own misery." Later, he was recaptured. His guard - whose family had been killed in the bombing of Dresden - bore no animosity, simply saying: "Das ist Kreig - that's war."[45]

On his first six escape attempts Staff Sergeant Crumb was recaptured. In April 1945 as the Russians

46. Extract from the War Diary of 2 Divisional Ordnance Workshop (RCOC); August 19, 1944.
47. Stone, op.cit., 6 September 1942.

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approached his Prisoner of War camp he escaped yet a sixth time and reached American lines. At war's end he was in England and on June 29th he experienced: "...a glorious sight. We sailed out of the fog into bright sunlight, there in front of us were the beautiful green hills, flanking the city of Halifax. The picture came so suddenly before us that not a man could speak, we just crowded the rails (of the ship) to drink in the wonderful sight. It was like all the dark years of war were truly over, and we were home to the land of the free."

The Lance-Corporal H.W. Grear Building. A year after his capture, Staff-Sergeant Crumb received a letter from Lance-Corporal Grear's widow. He confirmed for her that her husband had been killed during the raid. That was the last he heard from her. On June 28, 1994 the 3PPCLI named their Maintenance Platoon building, "The Lance-Corporal H.W. Grear Building". All attempts to find Grear's next-of-kin failed. Appropriately, Staff-Sergeant Crumb officially opened the building to an appreciative audience that included 30 young Craftsmen from the unit and the base.

61 LAD - The Calgary Regiment. During April the Calgary Regiment was on a major exercise in Sussex. One evening Captain W.S. Hunt, commanding 61 LAD, was asked to prepare a list of parts required for six weeks of hard training.[48] A prodigious list was quickly prepared, accepted by the CO, and despatched to headquarters. Something indeed was in the wind! For, despite some comments, the parts arrived - but at the Isle of Wight, where the regiment had moved in early May to start combined operations training. In June they were briefed on the Dieppe raid plan.

The regiment's newly-received Churchill tanks had to be waterproofed for an eight-foot wading capability. Captain Hunt supervised the waterproofing program as well as day-to-day repairs. Tank Design Establishment personnel helped. A civilian firm manufactured the exhaust and air intake extensions. However, Captain Hunt had to coordinate delivery schedules, help on the design, and consult on fitting problems. To mount the kit, all arc-welders in the Canadian Army were under his command for a considerable time.

Even as 61 LAD was working on its unit's tanks, other LADs and workshops were assisting in preparations for the raid. For example, Captain R.G. Struthers commanding 55 LAD attached to the Fort Garry Horse had his welders working full-time that summer making shaped cone charges for bridge demolitions and Bangalore torpedoes for destroying barbed wire.[49]

For the assault the Calgaries were reduced to a minimum scale. The repair and recovery plan was also pared to the bone. Each squadron would be accompanied by six fitters in a truck. The OC of the LAD with a senior NCO and two mechanics in a jeep would coordinate their activities from a centrally-located crossroads. Communication would be by radio receivers. On withdrawal Captain Hunt was to ensure that all tanks were embarked and that no casualties were left on the beach.

The plan was never executed. The LAD remained in their TLC in the boat pool a couple of miles off shore. They could only watch and listen to the decimation of their regiment and then sadly they had to turn home. Their only consolation was that 27 of the 30 tanks made it to the shore.

But the rocky beach played havoc with tracks and suspension of the Churchill tanks, a point that tank designers noted for future use. The raid also illustrated many points useful for beach recovery and control. The lessons and experience of Dieppe were used to help prepare equipment and make repair and recovery plans for the D-Day landing less than two years later.

Observers to North Africa

The campaign in North Africa provided an excellent opportunity for studying at first hand the latest repair and recovery techniques in field operations. Consequently, several Canadian officers and NCOs were attached to First British Army for three months in early 1943. The group included Majors C.R. Boehm, S.D. Clarke, R.H. Noble[50] and L.D. McBride.

The group toured many REME units and their resulting report included many ideas which confirmed or were incorporated into RCEME doctrine. Among their findings was that the key to fast and efficient repairs was the supply of parts promoted by close cooperation between workshop and OFP and the

48. War Diary of 61 LAD as quoted in Hodgson, op.cit., page 61.
49. Struthers, Capt R.G.; discussion with the author, 1982.
50. War Diary of 1CBW, op.cit., page 135.

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timing of the supply of parts to the development of the battle. They advocated technical supervision of LAD by brigade workshop commanders as well as locating recovery equipment well forward.[51]

By the spring of 1944 equipment and men were pouring into England in preparation for the invasion of France. There was an extensive combat and combat service support training program. The staff at CMHQ was busy developing waterproofing methods. Workshops and LADs were busy readying equipment for invasion. Repair and recovery plans were developed for the deployment and embarkation in England and for landing on the beaches of Normandy. The experience gained from observation in North Africa, repair and recovery in Italy, and from the Dieppe raid added the final polish to preparations. The stage was set for D-Day.

51. Boehm, Col C.R.; *Report on REME Methods in North Africa*; CMHQ report, 1943.

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Chapter 3 - SICILY AND ITALY

"As night fell we braced ourselves against the rolling of the ship. By dawn the ship was strangely still. I do not know what we expected to happen during a landing over enemy beaches. Perhaps Dieppe was still in our minds at that moment," recalled Lieutenant-Colonel J.K. Bradford, CREME 1st Canadian Infantry Division, just before landing at Pachino on 10 July 1943.[1] RCEME had entered the crucible of war in a campaign which set the tone for the pride of accomplishment and esprit de corps that has carried on down to the present."[2]

Campaign Outline

1st Canadian Infantry Division, supported by the Three Rivers Regiment of 1st Canadian Armoured Brigade, landed on the beaches of Pachino on 10 July 1943 as part of an Allied two-corps assault on Sicily. Over the next five weeks the division fought first north then east through the narrow twisting gorges of mountainous central Sicily. Then, passing into reserve before Mount Etna, the division prepared for a landing in Italy.

On 3 September the division and the armoured brigade landed almost unopposed at Reggio, Calabria. The Germans retreated north and the Italians surrendered. Pursuing the enemy almost without contact for six weeks, the Canadians moved swiftly along the southern coast of Italy then turned northwest to the Foggia airfields. Moving into the central Appennines they captured Campobasso. Then the enemy vanished and the Canadians halted to shorten their greatly-extended supply lines, overhaul equipment and prepare for winter.[3]

Shifting right to the Adriatic coast the Canadians assaulted the German Winter Line on 1 December 1943 capturing Ortona four weeks later. By the end of January 1944 their attack ground to a halt. 5th Canadian Armoured Division came into action in February. The Canadians, now at corps strength, held the line.

During April, 1st Canadian Corps was shifted west for the attack on Rome. 1st Armoured Brigade supported the assault by the 13th British Corps across the Gari on 12 May 1944. Four days later 1st Canadian Corps took over the lead in the attack up the Liri valley. Two weeks later - on the eve of the Allied landings in Normandy - Rome fell.

After a seven-week rest the Canadians moved north for a show of force before Florence. Then, while 1st Armoured Brigade continued to support an attack northeast from Florence, 1st Corps, having shifted once again to the Adriatic coast, attacked the Gothic Line in late August. Rimini fell on 22 September. Then the rains came and the advance slowed down.

The Canadians had a brief rest and then resumed their slow advance in the waterlogged Romagna. Another brief rest was followed by another month of bloody river crossings. In January the ground froze and the Canadians inched their way up to the Senio River and stalemate.

In February the 1st Canadian Corps withdrew from the line and started the long trip via Leghorn, Marseilles and the Rhone Valley to join their brethren of 2nd Canadian Corps in 1st Canadian Army.

Campaign Support - RCEME

The Italian campaign was started as a temporary expedient to relieve the pressure on Russia, thereby

1. Bradford, LCol J.K.; *Expedition Force Husky*; unpublished article, 1957; page 5.
2. Nicholson, LCol G.W.L.; *The Canadians in Italy 1943-1945*; Queen's Printer, 1957; pages 3-4.
3. Nicholson, op.cit., footnote on page 276.

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maintaining the momentum (of the victorious North African campaign) in the war against Germany.[4] However, the main effort was to be Northwest Europe. Consequently, after the capture of Rome, troops were withdrawn and the Italian campaign became one of limited means. Campaign support, which included RCEME, was a crucial factor.

In supporting the campaign, Canada's Craftsmen distinguished themselves. Whether on the battlefield or in the support areas they worked hard to assure an adequate flow of combat-ready equipment. Often the results of their efforts to repair, recover, design, modify or manufacture equipment had a direct effect on the course of battle.

On 16 September, 1944 during the Battle for the Gothic Line Sergeant R.L. Kelly of 67 LAD attached to 7th Anti-Tank Regiment went forward to Polerelli to repair a knocked-out self-propelled gun. Skilfully and courageously he worked several hours in total darkness. Despite heavy shelling and mortar fire, he completed the task by dawn. Two days later he repaired another gun under similar conditions. It was essential that the gun be back in action as the enemy had Tiger tanks in the area. On many other occasions he repaired guns and vehicles in the most forward areas, ensuring that much-needed equipment was fit to use. Sergeant Kelly was awarded the Military Medal.[5]

During the final advance to the Senio River in December 1944, the Lord Strathcona's Horse were required to cross a hastily-built bridge over the Fosso Munio. However, before leading the tanks across, Captain J.G. Wilkin, commanding 53 LAD attached to the unit, went forward on foot in the face of heavy enemy shelling (estimated by one observer to be falling at the rate of 150 rounds per minute in the area) to examine the bridge.[6] He found that the bridge had been launched at such an angle that it was impossible for tanks to use it.[7,8]

Captain Wilkin quickly called forward the Engineers to improve the ramp with an armoured bulldozer. The unit's tanks started across the bridge but the second became bogged down completely blocking the route. Captain Wilkin again went forward on foot and arranged for the use of a nearby armoured bulldozer. The driver, one of those sappers who never accept defeat, reversed his machine up to the site while Captain Wilkin and his two recovery crew members carried the heavy tow cables. They made the hook-up to the tank and directed its recovery, thereby clearing the bridge and ensuring the support essential for the bridgehead on the far side. Captain Wilkin was awarded the Military Cross and the engineer driver, the Military Medal.[7]

In early 1944, the 5th Canadian Armoured Division replaced an Indian division in the line in the Ortona Salient. On 8 February 1944, Sergeant R.L. Hurry of 11th Canadian Infantry Brigade Workshop was manning a divisional recovery post at a bridge in the forward zone. He was notified that a scout car carrying secret wireless equipment was bogged down in a minefield, under direct enemy observation. Without hesitation, he moved forward with his crew and despite intense mortaring recovered the vehicle. Two days later, three tanks of the Perth Regiment became mired in washed-out roads. Sergeant Hurry and his crew built a road to the tanks, labouring for more than six hours under threat of mortar fire to do so, and recovered the tanks in time for an attack next day.[9] Sergeant Hurry was awarded the Military Medal. (On 3 March, 1987, friends and members of the Hurry family gathered at the Canadian Forces Base Petawawa. In a simple, moving ceremony the new workshop building of Maintenance Company 2 Service Battalion was named the "Sergeant Robert Louis Hurry M.M. Building" as tribute to a man who had served his country with courage and determination.)

Perhaps the most outstanding example of combat service support under fire having a direct effect on the battle occurred at the start of the fighting for Rome on 12 May 1944, with an assault across the Gari River on the Gustav Line. The success of this assault was greatly influenced by an extraordinary act of innovation and courage by Captain H.A.G. Kingsmill. In the days before the assault Captain Kingsmill, commanding 61 LAD attached to the Calgary Regiment, devised and built a novel device for launching a Bailey bridge across the 60-foot wide river. The bridge, 100 feet long, was carried forward on two tanks. The

4. Nicholson, op.cit., page 6.
5. Sgt Kelly's Citation.
6. Nicholson, op.cit., pages 637-8.
7. McAvity, LCol J.M.; *Lord Strathcona's Horse (Royal Canadians) - a Record of Achievement*; privately published; pages 174-177.
8. RCEME Technical Bulletin 8/2, page 17.
9. RCEME Technical Bulletin 8/1, page 22.

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lead tank's turret had been replaced by rollers and supported the front of the bridge. The rear of the bridge rested on the rear tank. The idea was that the lead tank would drive halfway across the river, then the rear tank would push the bridge across. The night before the assault, conventional bridges were constructed at other sites. There was no activity at the site selected by Captain Kingsmill until early morning. Then, as a result of many rehearsals and careful preparation, the bridge framework was quickly assembled. Under direct enemy observation and intense gun fire, Captain Kingsmill coolly walked backwards over a distance of 500 yards in front of the tank-borne bridge. He directed it successfully into place at the first attempt. Wounded by an exploding shell, he remained at the river crossing during the final securing of the span. When an enemy counterattack developed from the opposite side of the river, he climbed inside one of the supporting tanks and methodically proceeded to machine-gun the German fire position. Determined to stem the attack, he called for and received artillery support. Not until the counterattack was beaten off and the bridge firmly in place did Captain Kingsmill leave to have his wounds tended. His gallant action contributed directly to the smashing of the Gustav Line. Captain Kingsmill was awarded the Military Cross.[10,11]

Meanwhile, at another crossing 500 yards away, half the tanks of the Ontario Regiment had crossed the Gari only to become mired in the marshy river flats directly in front of enemy positions a scant few hundred yards away. Captain G.L. Patton and Sergeant F.L. Carson of 59 LAD supporting the regiment, while working under continual heavy fire, succeeded in recovering 23 bogged tanks while in full view of the enemy. Captain Patton was awarded the Military Cross and Sergeant Carson the Military Medal.[12] (A half century later friends and members of the Carson family gathered at the Canadian Forces School of Electrical and Mechanical Engineering on June 18th, 1993. In a simple ceremony the School's new vehicle training building was named the "Sergeant Frederick Lyall Carson M.M. Building" as tribute to a man who had served his country with bravery.)

These incidents are representative of several in which some of Canada's Craftsmen, officers and men, were decorated for gallantry under fire. Others were mentioned in dispatches. Many others performed equally as valiantly without special recognition. Less dramatically, behind the front lines they kept the machines of battle going.

During the fight for the Gothic Line in August 1944, 5th Armoured Brigade suffered many casualties. For example, on one day alone, 31 August, the British Columbia Dragoons had a dozen tanks knocked out and two dozen more temporarily disabled.[13] However, as 5th Armoured Division's commander, Major-General Hoffmeister, noted in complimenting the brigade's workshop, their work "kept the brigade in good running order despite the poor replacement situation (and high casualties) during the action."[14]

During battle it was the duty of Sergeant F.A. Ouimet, the armourer of the Ontario Regiment, to move as for forward as possible behind the tanks in order to carry out immediate repairs to tank machine guns. Because of high rates of fire barrels often needed replacement and, consequently, he always carried a good stock in his vehicle. In one incident, as the unit was supporting the Indian Division prior to the assault across the Gari, he changed a machine-gun barrel under fire on a tank while it was under enemy fire and was engaging targets near Monte Cassino. For this and other similar incidents Sergeant Ouimet was Mentioned in Dispatches.[15]

In the advance from Reggio to Taranto, the tanks of the Calgary Regiment were often hindered by mined roads, blown bridges and very narrow streets. The hilly country and soft soil combined to keep the heavy tanks on the few good roads. 61 LAD supporting the regiment stayed close to the tanks on these long moves and was frequently called upon for difficult recovery jobs. On 13 September, as Captain W.D. Schofield noted in his war diary, he "came across a tank that was leaning very badly over the side of the bank ...tried to pull it out with the recovery vehicle but unable to move it ...put two tanks and the recovery vehicle on it and took it on down the bank. The job took most of the day."[16]

However, Captain Schofield had more problems the next day when he went "to the tanks and waited until all the traffic was through [Catanzaro] and then proceeded to pull the tanks through the street which

10. Nicholson, op.cit., page 402.
11. RCEME Technical Bulletin 7/1, page 36.
12. RCEME Technical Bulletin 8/3, page 10.
13. Stacey, Col C.P.; *The Canadian Army 1939-45*; Queen's Printer, Ottawa, 1948; page 150.
14. War Diary of 5 Armd Bde Wksp; Hodgson, LCol RA; op.cit., page 315.
15. Ouimet, Capt FA; taped interview with the author, 1983.
16. War Diary of 61 LAD; as quoted in Hodgson, LCol R.A.; *The Corps of RCEME - a History to 1 Oct 1946*; 1963; page 101.

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was narrower than the tanks! This took until 0430 hours the next morning."

Even before the Italian campaign began, all hands were busy during the spring and early summer modifying new equipment, waterproofing their own unit vehicles and inspecting and instructing on other units' waterproofing. Training took place in Scotland. The complete switch from Ram tanks to Shermans gave the workshops a lot of hard work. In the short time allowed, getting acquainted with an unfamiliar tank and the 75mm gun with which it was armed was no easy task.[7]

The planning for the Italian campaign had been done as an extension to the North African campaign. But Sicily and Italy were not flat desert and the Germans made the most advantage of the terrain. It was the turning point of the war as priorities shifted to forthcoming Northwest Europe campaign. Not everything could be foreseen or provided.

Consequently, as the campaign progressed, the lengthening lines of communication, the shortages of equipment and parts and the heat of battle on muddy plains or narrow mountain gorges created special problems demanding technical solutions that had to be worked out and quickly implemented on the spot. It was engineering in action! Some examples are: beach recovery, the Olafson bridge, battlefield recovery and equipping 5th Armoured Division.

Engineering in Action

Beach Recovery - Pachino. In the assault, recovery on the beaches was carried out by a specially-formed Beach Recovery Group and the recovery vehicles of the LADs. Valuable assistance was given to those units which had to land in up to six feet of water with "B" vehicles, although many units were fortunate enough to land dryshod.[17]

Olafson Bridge. During operations in northeast Italy in the fall of 1944, the commander of 3rd Infantry Brigade, Brigadier J.P.E. Bernatchez, felt that the infantry urgently needed a light footbridge for crossing the numerous canals and rivers between Rimini and up to and past Ravenna in the Po River valley.[18,19] He asked his BEME, Captain E.A. Olafson, to build such a bridge. Captain Olafson and his AQMS, Warrant Officer (Class 2) C.C. Houghtaling, designed and manufactured a bridge using half-inch steel pipe in sections or spans of fifteen feet. The spans had a strong gusset built on the ends so that they could be pinned and trussed to one another to make a bridge up to 75 feet in length. Each section was tested by placing the ends on blocks and having men stand at two-foot intervals across the span.

A special workshop of about 45 men using all the welding equipment available from 15 different units in the division was set up, running three eight-hour shifts 24-hours a day for over a month.[20] Although material and welding rods were very difficult to obtain, enough bridging was built to supply each brigade with four sets 75 feet in length. Captain Olafson and Warrant Officer Houghtaling were appointed Members of the Order of the British Empire.

RCEME constructed this bridge rather than the Engineers because of the latter's very heavy workload and lack of the welders required for this type of work. The bridge proved so satisfactory that when 1st Division arrived in Holland in April 1945 a workshop was set up at Hengelo to build more bridges. However, the war ended just as this work got underway.[18]

Battlefield Recovery. On 21 December, 1943, Captain J.C. Armstrong commanding 60 LAD attached to the Three Rivers Regiment received a message that six tanks were bogged down in the minefield during the advance to Ortona. The tanks which had been supporting an infantry attack were buried up to their sponsons in mud, well forward of the infantry line and exposed on three sides to mortar, machine gun fire and sniping. The tanks were needed for a further attack planned for the 24th. Sappers had cleared a route through the minefield by the 23rd. By two o'clock that afternoon Captain Armstrong and Sergeant F.J. Fontaine each commanding a recovery tank proceeded to extricate the tanks from the battlefield. They finished by five o'clock. Their efforts ensured that the tanks were available for the attack as scheduled. Captain Armstrong was awarded the Military Cross and Sergeant Fontaine the Military Medal.[21] (On November 17, 1994, nearly a half century later, friends and members of the Armstrong family gathered at the

17. Hamilton, LCol W.G.; *The Corps of RCEME - Historical Background*; unpublished booklet; page 10.
18. RCEME Quarterly 2/1, page 16.
19. Nicholson, op.cit., pages 607 and 625.
20. DeMaio, LCol A.; *History of RCEME 1 Cdn Div from 19 November 1943 to 21 March 1945*; unpublished notes, 1963; page 9.
21. RCEME Technical Bulletin 7/4, page 22.

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Militia Training and Support Centre Meaford. During a moving ceremony the Centre's new maintenance building was named the "Major John C. Armstrong, M.C. Building" as tribute to a man who had served his country with courage.)

Equipping 5th Armoured Division. A shortage of shipping space had forced the 5th Division to leave its heavy equipment in England. Consequently, it had to take over the vehicles and equipment of 7th British Armoured Division which was moving from Italy. The equipment - including tanks, heavy gun tractors and medium guns - had been in action a long time and was in poor condition. Re-equipping the Division was a lengthy process and involved a lot of hard slugging for the workshops.

Great dissatisfaction was expressed over the condition of this equipment and the fact that a high percentage of the transport was "two-wheel drive." This might have served on a dry and level desert but the mountain grades and winter mud of Italy were another matter. To make matters worse, it appeared that a natural spirit of camaraderie among the veterans of the desert fighting had led to unofficial 'swapping' of the 7th Division's better vehicles for the worst in other units and formations of the Eighth Army before the Canadians arrived and it was these latter vehicles which passed into the hands of the Canadians. However, the job had to be done so the division's workshops set up shop and went to work.[14]

In 1st Medium Regiment the fall of shot from newly issued guns was not consistent, nor had there been time to calibrate the guns or diagnose faults, other than to blame the notoriously inaccurate maps. Finally, however, just before Ortona, Staff-Sergeant Houston of 10 LAD attached to the regiment went to work with a vengeance. Guns were dismantled one by one. Recoil systems were inspected and palliative treatment applied. From more than one gun a full handful of sand was extracted from the vital recoil system. Water for buffer fluid was found in others. Most buffer and recuperator rods were red with rust but, with fiendish delight, Staff-Sergeant Houston used strictly forbidden files and emery paper to restore them to working order.[22]

Throughout this, their first campaign, Canada's Craftsmen developed the RCEME System - forward AWDs, divisional recovery officer, CREME communications and liaison with other services.

Developing the RCEME System

"The majority of the work of RCEME is done before and after the battle. This in no way detracts from the work of attached RCEME tradesmen, LADs, AWDs, telecom sections and recovery during battle, which is vital," wrote Lieutenant-Colonel A. DeMaio, CREME 1st Division, in his report on the battle for Rome in May 1944.[23] In planning for this battle he considered type of terrain, traffic routes, bridges, diversions, the battle plan, employment of brigades, frontages, etc, in order to answer two questions: how could brigade workshops and the divisional recovery plan best serve the brigade groups. During the battle "no gun or vehicle became lost to the Division through lack of repair facilities. He was on the road day and night supervising his RCEME road patrols and by his unfailing good humour kept morale at the highest pitch."[24] Lieutenant-Colonel DeMaio was appointed an Officer of the Order of the British Empire.

It became normal in battle to send an Advanced Workshop Detachment (AWD) from the brigade workshop forward with the brigade headquarters. However, because a breakthrough and rapid follow-up by 1st Brigade was anticipated for this battle, a double-sized AWD comprising 2 officers and 40 men was sent. The best men available were chosen and given sufficient technical equipment, tools and spares to be self-sufficient for a considerable time.

As the battle developed normal AWDs were sent to the division's other two brigades. These three AWDs completed nearly 600 jobs and the main workshops completed over 500 jobs in support of the battle. An analysis of the jobs done in the main workshops showed: mechanical failures - 95%, battle casualties - 2%, and road accidents - 3%. In the AWDs the percentage of battle casualties was higher. Shrapnel took a considerable toll on radiators, petrol tanks, tires, etc. However, unless a vehicle received a direct hit it was usually possible for the AWD to get it running again.

A further innovation came later in February 1944. A Divisional Gun Shop Detachment made up of the armament sections of the three brigade workshops became a production line and a standards line. To

22. *Story of 1st Medium Regiment 1939-1945*; privately published, 1945; page 47.
23. War Diary of CREME 1 Div, June 1944.
24. LCol DeMaio's OBE citation.

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save backloading and/or movement of repair crews and spare parts over long distances on congested, narrow and often muddy roads the Detachment was moved as close to the gun positions as practical. In addition, during battle one of the armament sections was moved forward as an AWD to give immediate service to guns temporarily knocked out of action. This arrangement was so successful that it continued to the end of the war.[20] (Based on this innovation in providing EME services, "Repair as far forward as possible" and "Use Mobile Repair Teams" became EME tenets in 1994.)

In order to coordinate recovery work and maintain liaison between posts, the officer in charge of the forward AWD was detailed as Division Recovery Officer. All workshop recovery vehicles were placed at his disposal. He was given a No.19 Wireless Set for communicating with CREME HQ. This worked so well that it was decided to appoint a full-time Division Recovery Officer.

The CREME did not always have a "wireless set" as Lieutenant-Colonel Bradford noted earlier in the fall of 1943. "It was one of the improvisations that we experimented with after we had left Foggia. Signals had cooperated to the extent of providing the actual wireless vehicles. I supplied the operators from among my own men. Each workshop had one set and there was one outside my caravan with its accompanying noisy little generator set. This ad-hoc CREME net was also used by the divisional surgeon for a similar link with his opposite number at Corps. Before long we found that we were far outstripping any legitimate Signals installation in the Administrative areas as far as traffic volume went. Valuable men who had formerly been used as DR's were now available for other duties."[25]

During the latter half of December 1943, as the battle for Ortona raged, several important meetings took place in order to improve RCEME services. As a result of a meeting between the OC of the Divisional Signals Squadron and CREME's Telecom Officer, Captain MacRae, a system of constant inspections and immediate repair service was established. Complaints on the repair work soon ceased. Signals brought the work in to the telecom section, a great deal of work was performed and the curve of inspections levelled out at a high figure during re-fit and battle. In addition, the telecom sections from the workshops were brought forward where they often worked with the signals maintenance sections. Location states and large RCEME signs were introduced to assist front-line units to locate telecom services night and day.[20]

When 2 Canadian Infantry Brigade Workshop landed in Sicily the instrument section didn't have a workshop van. "All that we had was a 15-cwt truck to stow the tools for 5 tradesmen," recalled Artificer-Staff-Sergeant F. Griffen. "We had to do all of our repairs out in the open. We had had British equipment while in England. However, we were not allowed to take it with us because of lack of space on the ships. Nevertheless, we quickly made a deal in Italy and got a German Ford 3-ton truck on which was mounted an Italian made wooden van body. It was fitted with work benches and we used it throughout the campaign." Again Craftsman ingenuity had prevailed! "However, when we packed up to go to Holland we had to leave our van behind. When we arrived there we were issued 60-cwt office-van trucks in which we mounted work benches."[26] One of the lessons of the campaign was the necessity of workshop vans in which to properly carry out repairs to delicate instruments.

By spring 1944 the RCEME organization comprised fifty units or headquarters. This included thirty-five LADs, seven second-line workshops, three third-line workshops, one recovery company, four CREME headquarters, one DEME headquarters and attached RCEME tradesmen to units. In all there were about 4,000 in this RCEME organization.

Even as this RCEME system was developing, an impressive record was being compiled by Canada's Craftsmen in units, workshops, AWDs, LADs and recovery companies. A craftsman's life was work - but not always all work. Nevertheless they shared the dangers with the fighting troops and often came under enemy fire.

A Craftsman's Life

On the night of 28 November, 1943, Armament-Staff-Sergeant J.A. McCoig was engaged on special recovery work on the Sangro River Crossing. During this period an ammunition column parked on the lateral road was shelled and two vehicles set on fire. Both were loaded with ammunition. Realising the danger he made strenuous efforts to put out the fire by means of foam extinguishers. He was successful in extricating

25. Bradford, op.cit., page 62.
26. Griffen, S/Sgt F.; unpublished notes; 1994.

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one vehicle but was forced to leave due to exploding ammunition. When the fire died down he drove his Recovery Tractor to the scene of the fire and cleared the road of all debris. During the entire period the area was being shelled by the enemy. His determination prevented the fire damage spreading and cleared the road for urgent traffic to proceed. Staff-Sergeant McCoig was awarded the Military Medal.[27]

In the late afternoon of 11 December 1943 the enemy laid a heavy concentration of artillery fire on the town of San Vito, a small town four miles south of Ortona. The battle for Ortona was raging just north of the town. The first shell landed in the main square of the town where the Advance Workshop Detachment of 3 Canadian Infantry Brigade Workshop was located and caused a number of casualties. Refusing to take cover Artificer-Staff-Sergeant T.M. Monteith promptly went to the assistance of the wounded. The shelling continued and another shell landed in the square, yet he cooly and courageously took control of the situation, organized rescue parties and evacuated the wounded to the Main Dressing Station. His promptness in handling the situation ensured the rapid evacuation of casualties and helped materially to maintain the morale of all troops in the vicinity. Staff-Sergeant Monteith was awarded the Military Medal.[28]

On 28 December 1943 the Battle for Ortona was in its final day. The main body of 3CIB Workshop was now in San Vito and was on three hours notice to move. The AWD had moved forward. The Recovery section was in Ortona. The gunshop had been brigaded with other gunshops and was in the divisional artillery's lines. The small arms section had moved two of their vehicles back to back and had set up a production line to work on equipment modifications. With almost no warning enemy planes suddenly strafed the workshop, causing 22 casualties of whom 9 died.[20,29]

The Christmas week of 1943, following the Ortona battle, was one of strong counter-battery shelling. 2nd Brigade Workshop had been sent to reconnoitre a site in Ortona but Major R.H. Ramsay was pinned down with this reconnaissance party and was forced to wait till the first week of January before his shop could get into the town. The first eleven repair jobs were their own knocked-out vehicles.[20]

On the evening of 11 January 1944 Armament-Staff-Sergeant H.M. Paige of 1 Canadian Armoured Brigade Workshop had come forward to the Ontario Regiment's leaguer to do bore measurements on the regiment's tank guns. "We had been in action for a long time," noted Sergeant F.A. Ouimet, the unit's armourer, "and we hadn't had a chance to do that work. We really appreciated the help from the workshop. Later in the evening after the work was finished the workshop crew billeted in with us. However, something told me that the enemy might do something that night, because the leaguer was in a far forward position and exposed. So I moved my crew back a few hundred yards. That evening the enemy shelled the leaguer and Staff-Sergeant Paige was killed."[30] (He is buried in the Moro River Canadian Military Cemetery. 50 years later during the Department of Veteran's Affairs Commemorative Tour to Italy, Sergeant Ouimet visited his friend's grave.)

In February 1944 the AWD of 5th Armoured Brigade Workshop found themselves "in the midst of big guns" near the front line on the Ortona front. Here the 5th Canadian Armoured Division had replaced the 8th Indian Division in the Canadian Corps sector of the front line on 9 February. The Unit Historian wrote: "German shells have been landing on both sides of the AWD. Lorries are being damaged by shrapnel. Two men were wounded on the 27th."[14]

1 Canadian Infantry Division spent Christmas and New Year 1945 on the Lamone River. Two workshops were brought forward. 3rd Brigade Workshop went to Ravenna and 1st Brigade Workshop went to Russi where it was heavily shelled - from the end of December to mid-January - along with the divisional supply point and divisional HQ. This necessitated moving it to Ravenna where the other workshop had already located. Much work was done in this period but the workshops arranged to have their best Christmas dinners at no cost to production![20]

Supporting an armoured regiment in battle was long hard work, as the war diary of 61 LAD shows during the battles for Ortona in December 1943. "The LAD and their companions-in-arms, the regimental fitters, had little rest in the support of their regiment. The quick repairs, the recovery of equipment, the never-ending inspections of fighting equipment to determine its battle-worthiness and finally the exhaustive recovery and evacuation of equipment to the second-line workshop left little time for other than snatches of

27. Art/S/Sgt McCoig's Citation.
28. Art/S/Sgt Monteith's Citation.
29. Scott, Maj R; telephone interview with the author, 1995.
30. Ouimet, Capt F.A.; *DVA Commemorative Tour to Italy - May 1994*; taped interview with the author; 1994.

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sleep. Eat on the move was the order of the day."[16]

On crossing the Sangro River in December, the LAD and Regiment were bombed and strafed. Together with the mud and rain, living conditions were almost unbearable. Illness took its toll among the LAD members with two men being sent to hospital in three days, followed by Captain Schofield.

The next day Captain Kingsmill was sent in to command the LAD. Life continued under these most difficult circumstances ...more men left for hospital ...the LAD and regimental fitters inspected, repaired and replaced tank components to the best of their ability ...the mud and rain were ever present and the bombing and strafing continued. "Everyone was flooded out of their slit trenches by a very heavy rain. Some New Year's Eve," wrote Captain Kingsmill for the closing entry in his 1943 War Diary.[16]

Even though many craftsmen worked under fire or in adverse conditions, there were slack periods, invariably before and during battles, during which they re-equipped themselves, built trailers, kitchens, showers and generally applied the latest ideas for the internal administration and welfare of the men. Trade-testing of mechanical trades was, of course, going on all the time. In addition, from time to time the men made souvenirs out of enemy aluminum for themselves and for their generals. During a vist to the division's workshops after the Battle for Rome, CREME 1st Division presented Major-General C. Vokes with a napkin ring suitably engraved with the inscription "Pontecorvo, to Major-General Vokes from RCEME Services, 23 May, 1944." The presentation also marked the formation of RCEME; in battle, a point of pride for Canada's Craftsmen. Later on 10 November, General Vokes left the Division and his divisional RCEME presented him with a dinner gong comprising an 8th Army shield superimposed on a copper plate of Italy and Sicily with the badges of all the Arms and Services under his command. The gong proper consisted of 17 pdr, 25 pdr and 6 pdr shell cases cut to the correct tonal lengths on the advice of the Musical Director of Pescara.[20] (The dinner gong is now on display in the Senior Officers' Mess at the Royal Military College of Canada in Kingston.)

During rest periods, leave centres were set up and tours arranged. And there were a few parades. What is perhaps the first RCEME parade was held in mid-October 1943 during a period of rest for 1st Canadian Infantry Division after the capture of Campobasso. The reviewing officer was Lieutenant-Colonel J.K. Bradford, the division's CREME and also at this time acting as ADOS. He noted in his diary, "RCEME polished itself up and began to shine with smartness and I decided that it would be an excellent time to get the entire RCEME and RCOC of the Division together on one massed church parade.

"With the newsreel photographers grinding and with the RCEME colours as markers for the first time in the history of the Canadian Army, the units marched by smartly after the church services ...my feeling was one of intense pride in the men of the Corps who had performed so valiantly in their normal function and who now stepped by so smartly as combatant troops.

"After the inspection, the officers retired to long tables under tents for a ceremonial Italian dinner. The NCO's and other ranks were far from neglected and even the local population celebrated it as a feast day. The historical day came to an end and we finally returned to our respective quarters, to the endless task of cleaning up a division's equipment, to the responsibility of readying it against the next action and to the routine duties of any headquarters, whether in the field or not."[31]

But not all parades were as historical. On 18 August 1944, 61 LAD dressed their best and then waited in vain for three hours in the rain for an expected visit from Prime Minister Churchill. Although the PM spoke to the Regiment he missed the gallant LAD. Their disappointment was eased somewhat by a double rum issue.[16]

Other parades were craftsmen-oriented and one in particular reflects the calibre of Canada's Craftsmen during the Italian campaign. On 25 August 1943, as 1st Canadian Infantry Division was resting after the Sicilian campaign and preparing for the landing in Italy, General A.G.L. McNaughton visited the three divisional workshops, all located in the same area.[32] He came into the area and rapidly fired questions at the officers of the workshops about the effectiveness of equipment under active service conditions. The craftsmen had reassembled a hitherto-unidentified German half-track troop carrier from the wreckage of three. The carrier still had the high-powered Italian wireless transmitter. He examined both eagerly. When he reached 1st Brigade Workshop he found that a table had been laid out with Italian wines, nuts, fruit and

31. Bradford, op.cit., page 60.
32. Bradford, op.cit., page 32.

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sweetmeats which he enjoyed while talking to the men from the workshops. On departing he commented that he was delighted with "the record of accomplishment of RCEME under fire."

Production - at the front

"We were involved in all of the Regiment's battles," recalled Captain G.L. Patton, the officer commanding 59 LAD attached to the Ontario Regiment, "having 1 killed, 2 wounded, 2 POW's, 1 MM and 1 MC." His LAD had 32 men, 2 recovery tanks, 2 heavy (Mack) recovery trucks, welding and facilities for minor repairs. They were proud of their ability, "to make stoves for the troopers" and, most importantly, keep the tanks operationally fit no matter what. "Our LAD motto was, 'If we can't fix it, no one else can.'" For example, "Throughout the night (13 December 1943) recovery teams of the Ontario Regiment (and its LAD) worked to free "C" Squadron's tanks from the deep mud of 'Lager' track."[33] The tanks were used successfully the next day in support of the 1 R22eR attack on Casa Berardi.[34] On 18 May 1944, "Every tank of the two leading squadrons of the regiment received at least one direct hit by high explosive."[35] Many were lost. The LAD was able to recover and repair 15 and have them ready for the final assault on the Hitler Line.

The Italian Campaign was the first test of Canada's Craftsmen as significant contributors to the success of battles. They established an excellent record of keeping equipment operationally fit no matter the danger, dirt or difficulty. Often they worked alongside the forward troops in full view of the enemy. It is a record that is being proudly maintained.

33. Patton, Capt L.C.; *Light Aid Detachment*; Ontario Regiment Newsletter 1994.
34. Nicholson, op.cit., page 310.
35. Nicholson, op.cit., page 410.

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Chapter 4 - D-DAY

"Russia bleeds while Britain blancos" crudely painted on a rough wall in London's West End brought tears to the eyes of Saul Tolmasky, 75 LAD's Russian-born Corporal. "When are we going to start the Second Front?" he asked in late 1943.[1] Many people were asking the same question. But vast preparations were required for the success of such a venture. When the Corporal asked his question, planning for the invasion of France had been in progress for six months. Under the code name Operation OVERLORD the invasion had been tentatively set for the spring of 1944. The aim was "to secure a lodgement on the continent from which further offensive operations could be developed.[2]

Plan for Invasion

As early as January 1943 it had been planned to use the Canadians as a breakout force from an invasion beachhead. This was confirmed a year later. But Canadians were also to participate in the assault landings which were to be in Normandy from the Carentan Estuary to the River Orne. So 3rd Canadian Infantry Division and 2nd Canadian Armoured Brigade came under command of 1st British Corps as part of the assault force.[3]

The operation was to be a combined Canadian, American and British undertaking. There were to be airborne landings the night D-1/D to secure the flanks. The main assault was to be on a five-division front which included one Canadian, two British and two American divisions. The D-Day objective for the Canadian division was to seize an area 10 miles inland to include the high ground west of Caen, astride the main road to Bayeux.[1,4]

As the lessons from Dieppe and Sicily had shown, the requirements for the assaulting forces included overwhelming fire support, self-propelled artillery landing with the forward infantry and tanks and specialist landing craft for the various types of equipment. These requirements meant that a vast amount of equipment had to be landed and maintained over open beaches. Special organizations and equipment had to be developed for beach clearance and recovery. In addition, equipment had to be waterproofed.

The lessons from North Africa showed that repair facilities had to be well forward. Since backloading over open beaches would be difficult, the assaulting force had to include repair and recovery teams and mobile workshops. Canada's Craftsmen were to be part of the assault force.

Preparation for Invasion

Provision of administrative support for this invasion posed special problems. From concentration to embarkation, units would be unable to administer themselves as their stores and equipment would be packed up. In addition, they would be separated from their parent formations and would be split up into craft loads. As another problem, the five assaulting divisions and the follow-up divisions would all use the south central coast of England for concentration and embarkation areas.

A special organization was needed to optimize use of limited road assembly areas and vehicles as well as providing camps, accommodation, stores, hard standing for vehicles, etc. The British Army's Southern Command was given the task "to provide, in conjunction with the United States Army, a complete static organization to administer formations and units of 21 Army Group from completion of concentration

1. Hodgson, LCol R.A.; *The Corps of RCEME - A History to 1 Oct 1946*; 1963; pages 543-560.
2. Wilmot, Chester; *The Struggle for Europe*; The Reprint Society edition, 1954; page 183.
3. Stacey, Col C.P.; *The Canadian Army 1939-45*; Queen's Printer, Ottawa, 1948; Army, page 403.
4. Stacey, Col C.P.; *The Victory Campaign*; Queen's Printer, Ottawa, 1960; page 76.

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to time of embarkation."[5]

Since the Canadian assault troops were under the command of 1st British Corps, the REME organization of Southern Command was supplemented by 100 Canadian technicians with their tool kits. In addition to their trades, these men were also thoroughly trained in waterproofing. Canadian vehicles were treated as though they were British. Joint planning took place at all levels between the US and British. Joint sites were arranged for recovery posts, light repair sections and port workshop detachments. US advance workshops (equivalent to Canadian second-line workshops), however, were established separately. Units from both Armies arranged to share accommodation, pool their resources and turn themselves as much as possible into combat teams. Each unit was to plan for the servicing of its own casualties as well as assisting with any casualty of either Army.

The RCEME preparation for invasion had three main aspects. The first was preparation of vehicles for the channel crossing and landing, which in essence was the waterproofing program. The second aspect was the repair and recovery plan for movement to embarkation points and loading which included route clearance, provision of fast moving spare parts, final equipment (battery) tests and checks. The third aspect was organization for repair and recovery after landing and development of special recovery equipment for work on open beaches under fire.

One piece of recovery equipment specially designed to work on the beaches while giving its crew protection was the BARV (Beach Armoured Recovery Vehicle). The BARV was a converted Sherman tank which had been specially waterproofed for working in up to nine feet of water. The turret was removed and a high superstructure added to include air intakes, engine exhausts and a crew commander's platform. Externally mounted towing cables and snatch blocks were to be coupled and uncoupled under water by naval clearance divers. The BARV along with specially armoured and waterproofed crawler tractors comprised the equipment used for beach recovery and clearance.[6]

The Waterproofing Program

It has been written that without the waterproofing program "there would have been no D-Day."[1] The aim of the program was to have 90% of the vehicles land successfully after wading six minutes in water depths of up to five feet for trucks and seven feet for tanks. The waterproofing program was an operational success. It was also an engineering masterpiece. 95% of the vehicles landed successfully in conditions of rough seas with up to four foot waves and a strong rising tide.[1,7] Nearly 150,000 vehicles, none of which had been designed for wading or floating, were given final stages of waterproofing by a team of 650 mechanics in less than a month. During this time the whole invasion force was moving to embarkation points.

The responsibility for waterproofing Canadian equipment was assigned to Headquarters 1st Canadian Army where it was coordinated at the staff level with a special appointment of an AQMG (Waterproofing).[8] The basic task of the job, recalled Lieutenant-Colonel J.K. Bradford, who replaced Lieutenant-Colonel J.W. Bishop in the position in March 1944, was to create two types of waterproofing procedures. The first, more rigorous than the second, was done by 1 Canadian Base Workshop on the assault force's vehicles. The second was done by units in the follow-on divisions on their own equipment.

This responsibility placed a heavy burden on the unit technicians, who had to prepare and waterproof the same vehicles and equipment on which their division had trained long and hard for the landing. As Lieutenant-Colonel E.M. Shields, CREME 3rd Canadian Division, noted in early November 1943, his "organization has at the present time more commitments than it could handle."[9] That situation continued for another seven months until exercises were completed and the division was in its concentration area.

Before the waterproofing program started, an immense amount of work was devoted to solving each design problem that arose. Then a production process was developed for high volume of materials and equipment in a short time with limited work areas and routes and compliance to the manoeuvre plan.

It required much ingenuity to modify a jeep rapidly so that it could be driven completely under water

5. Bullard, Brig C.; *Operations Overload - the Role of REME*; as quoted in Hodgson, op.cit., page 548.
6. Rowcroft, Maj Gen Sir E.B.; *Paddlers All*; abridged version by Maj D. Spinks, REME Journal; page 7.
7. Wilmot, op.cit., page 294.
8. Bradford, LCol J.K.; *Waterproofing to LORE*; unpublished article, 1982; page 5.
9. War Diary, CREME 3 Cdn Inf Div; as quoted in Hodgson, op.cit., page 548.

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by a driver who sat on the top of the seat-back, immersed in water up to his waist with only the air intake and exhaust extension pipes knifing through the water like twin periscopes on a submarine. Driver training was vital. Drivers had to be drilled to remember that "they MUST keep the engine running until they got out [landed]. But time after time immediately the cold water hit the vital parts of the driver, he flinched and his engine stalled. How the Canadian army practised that manoeuvre!! It was undoubtedly responsible for the success of the landing."[8]

For tanks, weldments were designed for ducting the air in and the exhaust gases out of the tanks. The hull hatches were closed and sealed. The turret was locked with the gun pointing forward and the turret ring sealed. Quick-release gear - supplemented with explosive cord and electric detonators - was installed to enable the tank to shed its weldments and clear the turret ring, muzzle covers and hatches, thus making it completely combatant within seconds of reaching shallow water.

Driving a fully-loaded vehicle down a steep ramp into four feet of cold salt water set up strains in the vehicle completely outside the designer's conception and bore no relation to highway or cross-country operation. Chilling an engine from 150° to 60° F at the precise moment it was called upon to produce maximum torque, sealing the crankcase breather and the likelihood of a short circuit presented enough problems without the added losses of a poorly-maintained vehicle. Thus every vehicle was put into first-class condition before waterproofing was commenced.

For some equipment, such as machinery trucks, the problem was floatation. With the cabin or van sealed wave action would easily upset the vehicle. The problem was solved by leaving the van or cab doors open but sealing the load and internal fittings.

There were four main categories of waterproofing materials: hardware such as ventilation stacks or air intake tubes; prepared plastic compounds; adhesives which usually had a synthetic rubber base; and preservatives such as paints, greases and waterproof cloths. Thousands of tons of these materials were made up into kits each designed for a specific vehicle or equipment. Each kit included illustrated directions for waterproofing.

Waterproofing was carried out in three stages. The first stage was carried out in concentration areas and involved: inspection, maintenance, checks and general sealing of fixtures such as hull turret rings. The second stage was done at marshalling areas and involved final erection and fitting of hardware, adjustments and final sealing of fixtures. The third and final stage was done at embarkation and involved such actions as sealing of access ports, track lubrication and fitting of tow ropes.

Pride in the new RCEME Corps revealed itself too. On each vehicle after completion of each waterproofing stage the inspector painted one bar of the new RCEME colours vertically on the side of the vehicle. By the time the vehicle was waterproofed, it carried a RCEME tactical sign - the RCEME flag.[9]

Concentration and Embarkation

During the Autumn of 1943 a series of exercises attended by Colonel J.E. Bishop gave the staff the experience needed in setting up the assembly areas to meet the requirements of waterproofing and movement of troops and supplies. The first trial resulted in confusion because areas were not cleared in time to receive the incoming vehicles. Colonel Bishop consequently recommended that unit locations should be selected outside the embarkation area and that vehicles selected for individual landing craft loads would then move from these locations to join up with their landing craft.[10]

Four marshalling areas were to be set up. The Canadian units were served by Area A, Portsmouth. This area had 19 marshalling camps which could provide standings for 4,500 vehicles and 8 recovery posts. Repair work beyond the scope of the recovery posts was evacuated to a light repair section of a second-line workshop which was located near the main traffic routes. Each port had a port workshop detachment which assisted in approach route and hard standing clearance, in loading and in carrying out limited repairs.

Units of the follow-on divisions waterproofed their own "A" vehicles and equipment. Training for this was done by training a small cadre of specialists from each unit. These in turn would train two or three more, etc.[10] The Assault Force however, was issued with vehicles waterproofed to the initial stage. Southern Command supervised and/or checked all stages and did the final stages on all vehicles except "A" vehicles with the aforementioned team of 650 which included 100 RCEME technicians.

10. Bishop, Brig J.W.; letter to the author, 1978; page 2.

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The Tactical Plan

The Canadians were to attack on a two-brigade front in the centre of the Anglo-Canadian Zone.[1] The Canadian Zone was code-named JUNO. The Canadians were to assault over five beaches in that zone. 7th Canadian Infantry Brigade plus 1st Hussars would assault right over three beaches astride the mouth of the Seulles River near Courseulles-sur-Mer. 8th Brigade plus Fort Garry Horse would assault left over two beaches between Bernières-sur-Mer and St Aubin-sur-Mer. 9th Brigade and Sherbrooke Fusiliers were in reserve.[11]

H-hour was 0745 for 7th Brigade and 0755 for 8th Brigade. The first wave comprising amphibious - Sherman DD (Duplex Drive) fitted with floatation gear - tanks of the armoured regiments was to land at H-minus-5 minutes. This would be followed by the infantry, assault engineers and artillery at H-hour. The third wave comprising the infantry reserve companies and reserve battalions would follow at H-plus-20 and H-plus-45 minutes respectively.[11]

The RCEME Plan

For the assault, 3rd Canadian Division's RCEME worked as part of the overall 1st British Corps' REME. In addition to its normal divisional repair and recovery responsibilities, RCEME was to contribute to the beach group organization. During the first 48-hours, recovery was to be limited to recovery of vehicles from landing craft, water, beaches and beach exits. Recovery on roads was to be limited to route clearance. During this same period repairs were to be limited to "repair on the spot" with cannibalization supplementing the limited repair parts available.[1]

There was to be a Beach Recovery Section (BRS) as part of the Beach Group in each brigade sector, 23 BRS in 7th Brigade's and 22 BRS in 8th Brigade's. Each BRS was comprised of 160 men made up from the four brigade workshops of the assault force. Each BRS was to establish a Drowned Vehicle Point (DVP) to which all vehicle casualties would be brought. This would become the centre of RCEME activity on the beaches. Here would be sited the cutting and welding equipment so essential to recovery functions. The BRS would also assist in helping shove off landing craft stuck on the beaches although repair of these craft was a Naval responsibility.

The first elements of the BRS, the BARVs and armoured tractors, were scheduled to land starting at H-plus-15 minutes right after the assault companies. The BRSs were to be completely ashore by H-plus-9 hours. The CREME 3rd Canadian Division, Lieutenant-Colonel Shields, was to land at H-plus-7 to coordinate the work of the two BRSs.

There were to be fourteen LADs supporting the assault. Each was to land a recovery group of five men with a recovery vehicle (armoured or wheeled, depending on the type of unit being supported) at H-plus-4 hours. These were to be reinforced by another seven groups and a complete LAD by H-plus-9 hours.

2nd Canadian Armoured Brigade Workshop was to land twelve recovery groups late on D-Day. A further three groups from the workshop were to land on D-plus-1 and combine to form the only second-line workshop available to the Canadians for the first days. The three infantry brigade workshops were to land forward elements on D-plus-3.

The Assault

"WIND - west, force 15 knots; SEA - moderate, waves 3 to 4 feet; SKY - fair to cloudy with cloud increasing." These few words summarized the weather off the assault beaches at dawn on 6 June 1944. Because H-hour was ten minutes later than originally planned and because the wind was so strong that it drove the tide in-shore half an hour ahead of its time, assault craft landed amongst beach obstacles instead of in front of them. This and mines took a heavy toll on landing craft until the obstacles were cleared at next ebb tide.[7]

7th Brigade Sector. Because there was a further twenty-minute delay caused by the weather it had been decided not to launch the 1st Hussars' tanks. Then the decision was reversed and two squadrons were launched. B Squadron was launched 4,000 yards from shore and landed 15 out of 19 tanks on the proper beach at 0758 hours followed in fifteen minutes by the infantry. The order to launch A Squadron came later

11. Stacey, op.cit., Map 2.

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at 1,500 yards from shore. However, the squadron's formation was disrupted by fire and the rough and unruly weather. In the end, some tanks were not launched but were landed directly on the beach after the infantry had landed.

Captain P.C. Neil and his ARV crew of 54 LAD RCEME supporting the 1st Hussars landed at 0900 hours, thus becoming the first RCEME crew to land in Normandy. He immediately "set out to look for any of the Regiment's tanks that had bogged down or been put out of commission." This small group examined all disabled tanks, repaired or recovered what they could and then moved inland to their assembly area. They had much work to do. Several tanks had been flooded and immobilized. The reason was that the landing procedures on touchdown had been: stop in the water on the seaward side of obstacles, deflate, and open fire on the nearest pillbox. In so doing, however, several were flooded by the wind-driven rising tide.[12]

8th Brigade Sector. The state of the sea prevented the launching of the tanks of the Fort Garry Horse (FGH). They were brought to shore and landed after the infantry. The SP Artillery, on the other hand, had little trouble in landing and getting off the beaches. The recovery group of Captain R.G. Struthers' 55 LAD supporting the FGH had little trouble getting ashore with its regiment. The guns of the 14th Field Regiment were ashore and in action by 1130 hours. The recovery group of 34 LAD supporting this regiment was ashore too on D-Day, as was that of 37 LAD supporting Brigade Headquarters.

Infantry battalions had about five RCEME personnel on strength, a couple of vehicle mechanics for the universal carriers and three armourers. The Part 2 Orders of the assaulting battalions show that most if not all of the battalion RCEME people landed with the first waves.

The reserve unit of 8th Brigade, le Régiment de la Chaudière, started to land at Bernières-sur-Mer at 0830 hours. Craftsman C.A. MacDonald, one of the unit's armourers, drove a 15-cwt truck loaded with 6-pounder anti-tank gun ammunition. As he recalled, "I had to wait about 50 feet off shore for a few minutes while a bulldozer knocked a hole in the sea wall so that I could get ashore."[13]

At 1140 hours the reserve brigade, 9th Brigade, started to land at Bernières too. Craftsman C.J. Brown, an armourer with the Nova Scotia Highlanders (one of the Brigade's units), landed with his regiment. The first night he was on patrol for parachutists. The next morning he and his group of four captured three Germans who had been by-passed the day before. On June 8th, because the battalion had suffered many casualties, he was assigned as a gun number on one of the battalion's 6-pounder anti-tank guns. He did this duty by day and did repairs on weapons by night for a month.[14]

Moving about caused him problems, though, because he was still wearing his RCOC flashes. "During the period June 8 to 11 we were not sure if the Germans had some of our uniforms taken from prisoners on June 7," he recalled. "So when they saw my RCOC flashes they would hold me at gunpoint until I convinced them that we were in the same army. My sergeant saved the day and gave me a "North Novvie" hat, a set of flashes and a badge. When we came out of the line for a period of rest July 13-16, I was presented with a beret, a RCEME Badge and flashes.[14] But I didn't sew them on until December when I was posted to 9 Canadian Infantry Brigade Workshop. I still feel that I am part of that unit."

4LAA Workshop RCEME, commanded by Captain G.R. Currie, had been scheduled to land in the early afternoon with its regiment, 4LAA Regiment, along with the division's follow-up brigade, 9th Brigade. The workshop landed at 1400 hours and quickly moved ashore and set up shop in a quarry two miles inland near Reviers. For nearly two days at a critical time in the operation, this was the only RCEME unit of any size to go into operation in the beachhead. It was called upon to support many units.

Beach Recovery Sections (BRS). The workshop detachment of 23 BRS (7th Brigade Sector) landed at 0600 hours on the 8th. The beach was clear and a burial party from the Régiment de la Chaudière was busy collecting and burying the dead.[15] "The detachment marched to the Drowned Vehicle Point, dug in and started to work," recalled Captain W.J. Sutherland who was in charge.[16] "There was plenty of work and we were bombed and shelled for the first three days." Artisan A. Breton noted: "All we had were our tool boxes and our rifles and rations for two days. We fixed as many vehicles as possible. We only started jobs that we thought would take no more than two hours."[15] After a few days most of the work that could be

12. Hodgson, op.cit., pages 561-6.
13. MacDonald, Cfn C.J.; statement, 1942.
14. Brown, Cfn C.J.; *Memories of a Wartime Craftsman*; published in EME Journal 2/84, page 11.
15. Breton, Art A.; unpublished notes, 1994.
16. War Diary of 7 Cdn Inf Bde Wksp, June 1944, Appendix 8.

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done was completed, so "nine men were sent to help 22 BRS and the remaining twelve were returned to the main Workshop when it landed on 10 June."[16]

The workshop detachments of 22 BRS (8th Brigade Sector) were delayed until the early morning of the 8th, a day-and-a-half late. They found their recovery group personnel in a crowded temporary DVP on the beach. That afternoon the main DVP was cleared of mines and they moved in with their recovery equipment. The immense task of beach clearance, collection, classification and repair could be started while the battle raged a scant six miles away. By 22 June, as the number of wet landings had decreased, the workshop detachments left 22 BRS to join their units inland.

2nd Canadian Armoured Brigade Workshop. 2nd Canadian Armoured Brigade Workshop, on the other hand, did not fare so well. Only Roger Group, a 40-man advance group under command of Warrant Officer (Class 2) R. Maynard, landed in the late afternoon of D-Day. Without their tools and equipment there was little that they could do. So they made their way to their assembly area in "Happy Valley" near Fontaine-Henry and waited for the rest of the workshop.[17]

The recovery and workshop groups arrived off the beaches well ahead of schedule but did not get ashore until the mornings of the 7th and the 8th respectively, the whole landing area being glutted with ships which were scattered in their hundreds from the beaches to the horizon. Once on shore, however, they quickly moved to their first site and were in full operation by the evening of the 8th even though it "was one of continuous air-raids and extremely heavy AA fire." They repaired "tanks in which men had been killed ...and which looked as though they would never fire another round nor move another inch, but put them back in action, working day and night." As the unit chronicler, Sergeant J.E. Henderson, said simply "It was our job!"[18,19]

CREME 3rd Canadian Division. Lieutenant-Colonel Shields did not land until the afternoon of the 7th, as did his 2IC, Major W.G. Hamilton, and Headquarters staff who had embarked on another ship. The two parties proceeded to their assembly area independently a mile-and-a-half inland. The French civilians seemed unconcerned at the battle raging around them. The Resistance already had meted out harsh justice by hanging several traitors. The assembly area was still under sniper fire. It was a sleepless night watching red tracers of anti-aircraft shells arch lazily through the night sky toward aircraft strafing up and down the beach. At dawn the Luftwaffe returned to their bases and HQ CREME 3 Div started an uneasy day, Lieutenant-Colonel Shields went back to the beaches and Major Hamilton moved forward to join Divisional Headquarters.[12,20]

Securing the Bridgehead

Once off the beaches there were rapid advances inland, in some cases up to five miles. The LADs moved inland behind their units and were kept busy and soon proved their worth as the following example illustrates.

Captain J.H. Bourne's 35 LAD had landed on D-plus-1 in support of the division's anti-tank regiment, 3rd Canadian Anti-Tank Regiment, which was using 3-inch, M10 self-propelled (SP) guns. Soon after landing the LAD met up with its first big job. Two of the SP guns had been put out of action. The gun on one had been struck by a high velocity projectile at a point about one-third the length of the barrel from the muzzle. A piece of the barrel about eight inches long by two inches wide was punched into the bore, slid down and out of the breech - knocking a round out of the loader's hands - and continued on to the back of the platform where it crushed the coils and fins of the engine oil cooler mounted on the bulkhead.

The second SP had received a hit on the turret ring at the junction of the turret and the hull. The heat of impact effectively welded the turret to the hull. The LAD set about to salvage one SP out of the two. By rigging a large tree to lift the gun and mantlet clear of the turret (the lifting booms on the breakdown had neither lifting capacity nor the necessary height) they were able to exchange the guns. The SPs had been knocked out that morning and by mid-afternoon one rebuilt SP was returned to action.[12]

The advance came to a rapid halt on the 7th as enemy resistance stiffened. On that day the crews of 54 LAD recovered five of the First Hussar's tanks under fire as the unit crossed the Caen-Bayeux road. As

17. Maynard, MWO R.; *DVA Commemorative Tour to Normandy - June 1994*; taped interview with the author, 1994.
18. *Souvenir of the Campaign - 2nd Armoured Brigade Workshop*; privately published, 1945; page 7.
RCEME Unit Histories - Northwest Europe Campaign World War Two; unpublished DND report, 1945; Chap XI, page 2.
20. RCEME Unit Histories, op.cit., Chapter VII, page 1.

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the unit was withdrawn to re-equip and regroup, the LAD fitters redoubled their efforts preparation for the regiment's next task. Meanwhile, there was then little movement until the capture of the Carpiquet airfields on July 4 by 8th Brigade as a preliminary to the attack on Caen.[21]

During this period the work of the BRSs continued, the sea approaches to the beaches were cleared up and the division's second-line infantry workshops were able to land and begin supporting their brigades. While in Normandy the divisional workshops were located together and moved as a RCEME convoy in the Divisional Administrative Group. Their work was coordinated to make the best of parts shortages. 7th Infantry Brigade Workshop specialized in jeeps which other workshops cross-loaded to them for repair or cannibalization. 8th Brigade Workshop built all the special ambulance jeeps.[22]

By the middle of June, main parties were in the Divisional Administrative Area and unit residues followed in early July. The division's third-line workshops - 2nd Canadian Army Tank Troops Workshop and 3rd Canadian Infantry Troops Workshop - also landed and were in operation by the 18th and the 30th of June, respectively. As 8th Brigade started its breakout attack at Carpiquet on July 4, the advance party of 1st Canadian Advanced Base Workshop was moving into location near Bayeux - a scant fifteen miles away!

A divisional RCEME had landed as part of a corps REME. Canada's Craftsmen earned their spurs under fire in the turmoil and danger of the tidal beaches of Normandy. But by now, expanding to an army RCEME, they were ready to make their own mark in the struggles before Falaise and subsequent race to the Channel ports.

The Normandy Beaches Today

Today the Normandy beaches are as they were - a holiday centre. The only sounds are the sea, the wind and the voices of tourists. Gone is the thunder of war. The damage has been repaired. The only vestiges of that momentous summer are regimental monuments and military cemeteries which dot the countryside. There are several museums.

Memorials

The D-Day landing and the subsequent Northwest Europe campaign had the largest field force that Canada had ever mounted. There is, however, no Canadian national memorial like the Vimy Memorial in Normandy or Northwest Europe. The Canadian military cemeteries, however, are maintained by the Canadian Government. The regimental memorials were built, paid for and are maintained by the regiments who won the battles and glory for Canada. The nearest thing to a Canadian national monument in Normandy is the tank at Courseulles-sur-Mer.

The D-Day Tank. On that stormy morning 50 years ago 3rd Canadian Infantry Division landed, supported by amphibious tanks of 2 Canadian Armoured Brigade which provided direct fire support to the leading waves of infantry. These tanks were specially-modified Sherman tanks mounting a 75mm gun and were called Duplex Drive (DD) tanks. The upper part of the hull had a collapsible canvas skirt which gave it floatation - actually only a couple of feet of freeboard with the commander standing on the hull. This was not a lot in the stormy seas and rising tide in which they were to be launched! The rear idlers had been modified to drive propellers which gave the tank way and steerage. The tanks were to be launched with the infantry for the run in. Once the tank touched bottom the skirt was to be collapsed, the turret turned around and the first enemy target engaged.

On the Canadian right, A and B Squadrons of the 1st Hussars "ran in" with the leading infantry opposite La Valette and Courseulles-sur-Mer. However, some of the tanks sank on the way in. In the fall of 1970 local fishermen snagged their nets on one in the water off Courseulles. During successive tide changes a salvage company floated it to near the low tide-mark. Then, EME mechanics from CFB Lahr completed its recovery in December 1970. It was refurbished and named BOLD with AUDICEUX appearing in smaller letters below. On June 6, 1971 it was dedicated as a 1st Hussars' memorial. Shortly after this the 1st Hussars received requests from many units to put their plaques on the hull. Soon the tank was festooned with unit plaques.

However, the 1st Hussars could not support indefinitely the maintenance of the tank as an individual

21. RCEME Unit Histories, op.cit., Chap XI, page 2.
22. RCEME Unit Histories, op.cit., Chapter VII, page 1.

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regimental memorial. Ownership of the tank was turned over to the town and a large sign installed dedicating the tank "to the memory of all Canadian units that participated in the D-Day landings."

Maintaining the tank is a continual problem. The paint weathers and, because the plaques on the hull are attached by brackets, screws or spot welding, they are easily and frequently removed. Therefore, it must be periodically refurbished. For the 40th anniversary of D-Day in 1984, it was cleaned up by an EME crew from Lahr. The team mounted a special replica of the 1st Hussars badge on the turret on the side facing the sea.

That year one of the RCEME veterans of the Normandy battles, Captain S. Wallace represented RCEME on the Department of Veterans Affairs Commemorative Tour to Normandy. He noted that there was no RCEME badge on the tank. The RCEME Club had a 10-inch cast bronze replica of the first RCEME badge made. After some delays it was sent to CFE. In the summer of 1992 an EME team from CFB Lahr mounted it on the turret on the side facing the land. It was dedicated by the EME Colonel Commandant who noted that the two places of honour for placing badges - the sides of the turret - had gone to fighting units and to RCEME, symbolizing the close support that EME gives in the front line in the thick of battle. The fact that the 1st Hussar's LAD officer, Captain P.C. Neil, had later won the Military Cross (see page 56) emphasizes the point.

"Team Bold." By 1994 the tank needed to be refurbished again. In addition, it had sagged over the years as its road wheels deteriorated. So that spring, as an EME Branch initiative, "Team Bold," a small group of the remaining EME technicians in Canadian Forces Europe, journeyed to Normandy to give the tank another complete refurbishing. They placed supporting jacks under the hull, painted it, added "tac" signs, repaired plaques and added one, that of the 19th Canadian Army Field Regiment. It is fortunate that Team Bold had done its work, because on June 6, 1994 the Prime Minister of Canada, The Right Honourable Jean Chrétien, placed a wreath at the tank on behalf of the people of Canada in memory of those Canadians who had paid the supreme sacrifice in Normandy 50 years earlier. Representing RCEME at the ceremony was Warrant Officer Maynard. Once again Canada's Craftsmen had served their comrades well by ensuring that the tank was fit to be a proud memorial to the sacrifice and courage of the many Canadians who had served in Normandy.

RCEME Plaque at Fontaine-Henry. When 2 Canadian Armoured Brigade Workshop was at Fontaine-Henry it befriended a local boy, Guy Chrétien. 50 years later Mr. Chrétien had a small memorial park, called Place des Canadiens, built in Fontaine-Henry. Units involved in the liberation of the town were invited to place plaques on specially-built cairns in the park. A plaque commemorating the Workshop was made by 202 Workshop Depot. The plaque was unveiled in the park on the afternoon of June 6, 1994 by Major W.G. Hamilton, the 2IC CREME 3 Canadian Infantry Division for the landings and by Warrant Officer Maynard.[23,24] Warrant Officer Maynard stayed on a few days as a house guest of Mr. Chrétien.[17] The plaque cements a Franco-Canadian friendship begun in 1944 in the crucible of war.

23. Hamilton, LCol W.G.; letter to the author, 1994.
24. Due to heavy traffic Maynard was delayed. So the ceremony was actually "done" twice.

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Chapter 5 - THE NORTHWEST EUROPE CAMPAIGN

"We must blast our way on shore and get a good lodgement before the enemy can bring up his reserves to turn us out. Armoured columns must penetrate deep inland and quickly," said General Montgomery at a briefing three weeks before D-Day. Four weeks later, the beaches having been won, he was able to add that his "general objective was to pull the Germans onto the Second Army so that First Army can extend, and expand."[1] The campaign for Northwest Europe had begun.

Campaign Outline

While the Canadians and the British of 2nd British Army struggled to secure Caen as a hinge, the Americans of 1st US Army on the right extended west to the sea. Then advancing south and southeast they pushed the large German force into a pocket southwest of Falaise. By the end of July there arose the possibility of entrapping this German force by closing the gap near Falaise between the two allied armies. Seizing the opportunity, the Canadians, now three divisions strong, were directed south from Caen towards Falaise. The gap was closed by 23 August 1944.

The Canadians were next directed northeast to the Seine in pursuit of the fleeing Germans. They continued the advance during September, clearing the Channel ports to Antwerp. Their next task was to clear the Scheldt estuary between Antwerp and the sea. Completing this task by 10 November, they wintered on the Maas in front of Nijmegen and prepared for the attack on the Rhineland.

On 8 February 1945, the Canadians thrust southeast through the Reichswald and Hochwald to clear the west bank of the Rhine by 10 March. By now 1st Canadian Corps was arriving from Italy. With the two Canadian Corps now under its command, 1st Canadian Army thrust to the North Sea. By the end of April only small pockets in western Netherlands and coastal areas in northwestern Germany remained in German hands. Armistice was signed on May 8 and the Canadians prepared for the occupation of Germany or the return home.

Combat Service Support - RCEME

This was the best and most lavishly-equipped force of any campaign. By the end of July, 1½ million men, 1½ million tons of stores and _ of a million vehicles had been landed. Campaign support, which included the work of RCEME, was a crucial factor. Since 21 Army Group was based on the UK for equipment provision and fourth-line repairs, there were no large static base installations for 1st Canadian Army as were found in the rear areas of other war theatres. Semi-mobile advanced base workshops were provided on a scale of one-per-corps for fourth-line repair support. As well, there was a full scale of second- and third-line workshops for L of C, army and corps troops, several recovery companies and specialist workshops and the usual first-line and second-line support units - i.e. Light Aid Detachments (LADs) and workshops - within divisions and brigades.[2] In all there were about 150 RCEME units.

Canada's Craftsmen distinguished themselves throughout the campaign. Whether on the battlefield or in rear areas their continual support helped provide a steady flow of combat-ready equipment. Often their special efforts to repair, recover, manufacture or modify equipment or bring ammunition and rations forward to soldiers under enemy fire had a direct effect on the course of the battle. Their quick thinking in event of sudden attack frequently saved valuable equipment from destruction. Their work in the heat of battle under fire was an inspiration to the front line soldiers with whom they served and reflected the dependence on equipment for success in battle. RCEME service was delivered everywhere - on the battlefield under direct enemy fire, in unit locations or along the lines of communication. The dangers and work were shared by all

1. Wilmot, Chester; *The Struggle for Europe*; The Reprint Society edition, 1954; pages 232 and 341.
2. *Craftsmen of the Army*; Leo Cooper Ltd, London, 1970; page 23.

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ranks, and from these challenges have come the special camaraderie and traditions that are proudly remembered and carried on to-day.

As an example, on 25 October 1944, Corporal W.O. Pearson of 75 LAD was asked to perform a welding job on the regimental command tank of the Governor-General's Foot Guards. This intrepid veteran of World War One worked for two hours in the open, under fire, while the tank remained in action directing the regiment as part of 4th Armoured Brigade's push toward Bergen-Op-Zoom during the battle of the Scheldt. Corporal Pearson was awarded the Bronze Cross of the Netherlands.[3,4] (On November 25, 1994 a new welding training building at the Canadian Forces School of Electrical and Mechanical Engineering was opened by his son and named the "Corporal William Oliver Pearson, BC(NL) Building" in his honour.[5])

Battlefield recovery was an important part of armoured operations, particularly during attacks. It was the task that armoured regiments usually assigned to their LADs. Often the recovery of tanks during a particularly difficult attack became the deciding factor in success.

During the Battle of the Rhineland, the First Hussars were totally committed for a one week period - 26 February 1945 through 4 March 1945 - supporting the infantry attack on the Hochwald. During this period Captain P.C. Neil and his crews of 54 LAD recovered fifty-one tanks from the boggy, mined battlefield where the battle was still raging and which was subjected to extremely heavy artillery, machine gun and mortar fire. At one time, recovered tanks lined up along a sunken road were able to beat off a counterattack. Captain Neil was awarded the Military Cross.[6,7] During the fighting to close the Falaise Gap, an objective of the 4th Armoured Brigade was a feature known as Point 19, which was seized on 9 August 1944. Next day, the Governor General's Foot Guards were ordered to consolidate on this objective. This became very difficult because of a fierce counterattack and a formidable anti-tank screen which prevented the resupply of ammunition and fuel. Sergeant C. Fielding, who commanded the ARV crews of the regiment, volunteered to carry supplies forward. This he did three times under heavy fire, thereby enabling the regiment to hold its objective. Sergeant Fielding was awarded the Military Medal.[8,9]

The teamwork of officers and other ranks and the value of battlefield support is typified by that of 84 LAD attached to 22 Canadian Armoured Regiment, the Canadian Grenadier Guards. In Cintheau, Normandy on 8 August 1944 the regiment had harboured after losing 17 tanks to mines and anti-tank fire. Although all other armoured recovery vehicles were pinned down by a hellish concentration of high explosive and 88 mm fire, Sergeant K.F. Larochelle, crew commander of the armoured recovery vehicle of 1 Squadron, pressed on and by skilful manoeuvring reached his squadron's tanks. After servicing them, he devoted the remainder of the night to recovering a knocked-out tank, rendering it fit to fight the next day.

In the operation at Hill 195 the next day, the regiment suffered several tank casualties and when ordered to pull out there were three serviceable tanks which required recovery. The Hill was still under enemy mortar and shell fire with 88 mm guns covering the area. Captain L.G. Rupert, the LAD's commander, personally reconnoitred a way in and directed his recovery equipment to the tanks. He supervised the entire operation and the tanks were successfully recovered. He did the same thing on several other occasions during the campaign.

Again in Belgium at Wouwsche Plantage near Bergen-op-Zoom on October 23, 1944 he was called on to effect recovery of several tanks temporarily out of action due to mines. The woods north of the railway track contained machine gun positions and mortars. Captain Rupert, without considering his own safety, personally directed and supervised the successful recovery of these tanks.

Meanwhile, Sergeant Larochelle was given the task of recovering two disabled tanks behind the enemy's forward positions. Realizing the anxiety of the crews marooned in the enemy's midst, he immediately moved forward with his recovery vehicle. Reaching the disabled tanks he jumped down from his vehicle, adjusted the towing hitch and was about to mount his own vehicle when a veritable hail of shell fire descended on their position, cutting the towing hitch to ribbons. When the shelling slackened off he rallied his crew, improvised a new towing hitch and recovered both tanks in the face of a terrific crossfire. Later, on

3. RCEME Tech Bulletin 9/1, page 14.
4. Stacey, Col C.P.; *The Victory Campaign*; Queen's Printer, Ottawa, 1960; revision; page 390.
5. Opening of the Corporal Pearson Building; souvenir program, 1994.
6. RCEME Tech Bulletin 7/3, page 25.
7. Stacey, op.cit., pages 498 and 506.
8. RCEME Technical Bulletin 9/2, page 25.
9. Stacey, op.cit., page 229.

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1 March 1945 in the Hochwald Gap he snatched two slightly-damaged tanks back from a forward slope under direct observation of enemy anti-tank guns. Only the boldness of the move and the skill in hitching and getting away made the venture successful.

On his return he found that plans had been made to serve a hot meal to the forward infantry and tank crews who had been fighting steadily under appalling conditions of weather, terrain and enemy fire, Sergeant Larochelle volunteered to take the meals forward. Although it required several sorties over observed ground, he did not rest until every man in the area had been fed. The successful stand of the next day was in no small part attributable to the obvious rise in morale of all ranks following the hot meal.

Sergeant Larochelle was awarded the Military Medal for consistently displaying the highest qualities of leadership. His fighting spirit continually drove him to tasks "beyond the normal call of duty, setting an example to every man in 22 Canadian Armoured Regiment."[10] Captain Rupert was awarded the Military Cross because 84 LAD's excellent record, due to his leadership and executive ability in effecting repairs, recovering equipment, making modifications, improving equipment and maintaining guns, had kept his "Regiment in a state of fighting efficiency by virtue of its being able to maintain in the field a maximum number of fighting vehicles for all operations."[11] (On a warm, sunny August day 50 years later, friends and family of Captain Rupert gathered at Camp Borden for the formal naming of the newly-renovated workshop building. As part of a short, simple ceremony his widow named the building the "Captain Lloyd George Rupert, M.C. Building" in his honour.[12])

These incidents are representative of the many in which some of Canada's Craftsmen, officers and men, were decorated for gallantry under fire. Others were mentioned in dispatches. More performed equally as valiantly without special recognition. Canada's Craftsmen established a proud tradition of providing combat service support under fire. Perhaps less dramatically but often more importantly, behind the front lines they kept the machines of battle going.

On 10 February 1945, the GOC of 79th British Armoured Division, Major General P.C.S. Hobart, wrote a personal letter to Brigadier G.M. Grant, DDME, 1st Canadian Army, thanking him for the hard work done by Canadian third-line workshops in overhauling APCs. One of these units, 4 Armoured Troops Workshop, had completely overhauled 79 APCs (called Kangaroos) in 13 days with a working crew of 150 technicians. The Kangaroos of the division's 1st Canadian APC Regiment were ready on time for the Battle of the Rhineland.[13,14]

This is just one example of the high regard for RCEME held by operational field commanders and was reflected by Field Marshall Bernard Montgomery, Commander 21 Army Group, when he noted that Brigadier Grant "succeeded in a unique degree in instilling throughout the personnel under his command a proper sense of the importance of their functions and in imparting to them his own enthusiasm, drive and aggressiveness. The part played by the REME and the RCEME under his leadership in the achievements of First Canadian Army has been most substantial." Brigadier Grant was appointed a Commander of the Order of the British Empire.[15]

During December 1944, because the rapid advance had far outstripped the supply lines, the technicians of 2nd Advanced Base Workshop made a special modification on one hundred 40-ton tank transporters, converting them to bulk load carriers while retaining their tank-carrying capability. Later, this workshop designed and built special trailers from salvaged heavy trucks. These special trailers were used to carry forward the 65-foot pilings used for the Rhine crossing L of C bridges.[16] But RCEME personnel were not always supporting combat. They sometimes took part. For example, the AA&QMG of 4th Canadian Armoured Division told the officers attending his AQ conference late in the afternoon of 6 August that all the armoured vehicles that could be used to carry infantry into combat were to be loaned to 10th Brigade at once for the pending attack, which was the second phase of Operation Totalize, the drive to close the Falaise Gap.

Lieutenant-Colonel R.H. Noble, the division's CREME, ordered the twelve armoured scout cars on his LADs' establishments to report with drivers at once to the Brigade. The attack commenced on the

10. Larochelle's citation.
11. Capt Rupert's citation.
12. *Opening of the Captain Lloyd George Rupert, MC Building*; Souvenir Program, CFB Borden, 1995.
13. *History of 4 Armoured Troops Workshop*; privately published, 1945; pages 27 and 45.
14. Stacey, op.cit., page 487.
15. Brig Grant's citation.
16. *RCEME Unit Histories - Northwest Europe Campaign World War Two*; unpublished DND report, 1945; Chap XII.

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afternoon of 8 August and continued until the evening of the 10th, the RCEME scout cars being used to transport infantry in the attack. Colonel Noble recorded in his War Diary that, "Three Scout Cars received direct hits, one driver was killed. The splendid performance of RCEME personnel and vehicles in front line action has had a marked effect upon morale in the formation."[17]

For that attack, Craftsman H. Dundon of 45 LAD attached to 5th Anti-tank Regiment was a driver for one of the vehicles provided by the regiment for troop transport (a ½-track truck usually used as a 17-pounder gun tractor). During the attack his vehicle became entangled in barbed wire and was hit by German 88 mm gunfire. Craftsman Dundon was killed.[18]

The planners for OVERLORD had done their homework as perhaps it had never been done before. They had well appreciated the logistic problems posed by maintaining such a large force, across a sea gap, and over a lengthening L of C. However not everything could be foreseen.[19]

The heat of battle in the bridgehead, the Scheldt and the Rhineland created special problems demanding special solutions; technical solutions that had to be worked out and implemented. It was engineering under fire! Speed was of essence. Some examples include; AWD Kangaroos, installation of Wasp Flamethrowers, armour protection for M10 Self-propelled Anti-tank guns and AWDs for AGRA.

Engineering Under Fire

AWD Kangaroo. On the evening of 7 August 1944, Canadians from 2nd Canadian Corps quietly lined up south of Caen to attack towards Falaise. They were to implement a daring plan involving the tactical use of strategic bombers in close support of an armoured break-through at night. Lieutenant-General G.G. Simonds, the Corps commander, had decided to attack at night without using preliminary bombardment and to penetrate between the forward German strong points with four compact columns of tanks accompanied by infantry in heavily-armoured carriers. The infantry would debouch and seize the secondary positions. The bombers came from Bomber Command. But where had the carriers come from? They hadn't existed the previous week. They had been made on the spot from US M7 105 mm (SP) guns, "Priests," which had been used in the assault landings and had just been withdrawn from units of 3rd Division. As the troops crossed the start line, Major G.A. Wiggan and the 250 men of his AWD who had laboured long hours for four days, breathed a sigh of relief. Dubbed "Kangaroos" after the code name for the AWD, these APCs were a success story throughout the campaign.[20]

General Simonds was the spark behind this crash action program of producing APCs in Normandy. His Canadians in Italy had earlier experimented with APCs made of burned-out carriers towed by tanks. In the evening of 31 July the DDME 1st Canadian Army, Brigadier G.M. Grant, was instructed to set up an organization to convert 72 SP guns to APCs by 9 August. The date, however, was soon changed to 6 August with "as many a possible" by the night of the 5th.

The modifications were to be made in such a way that the M7s could be converted back into SPs. The job consisted of removing the 105-mm gun with mount and mantelet, welding armour plate across the gap left by the mantelet, overhauling the radial engine (the 100-hour check) and checking the transmission, the controlled differential, brake linings and running gear (the overhaul itself would normally take seven days to complete).

AWD Kangaroo was set up in two fields near Bayeux with the camp sited in the protection of a neighbouring orchard, about twenty miles from the start line. Fourteen Canadian and British units contributed and pooled their efforts and skills in the project.

The first crew arrived at the Kangaroo site late on the afternoon of the 2nd of August and had 14 equipments stripped before dark that night. The hours of work were O500 to 1100, 1230 to 1700 and 1800 to 2200. But as Craftsman A.M. Campbell of 2 Tank Troops Workshop later recalled, he worked steadily for the four days from 0400 to 2300. He was so busy he didn't even know what the next fellow was doing. Each had his assigned job. For example, Craftsman Campbell was track tightening or engine changing using his Diamond-T wrecker.[21]

17. War Diary CREME 4 Cdn Armd Div (Hodgson, LCol RA; *The Corps of RCEME - a History to 1 Oct 1946*; 1963, page 569).
18. Giroux, Mr. Yvon; telephone interview with the author and two photos, 1995.
19. Craftsmen of the Army, op.cit., pages 230-231.
20. Stacey, op.cit., page 210.
21. Campbell, Cfn A.M.; discussion with the author, 1982.

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All the RCEME/REME units were canvassed for electric and gas welding equipment with the tradesmen to go with them. Almost unlimited access to welding rod, armour plate, radial engine parts, oxy-acetylene welding sets and gases and radial engine overhaul stands was required.

The armour plate came from the Help-Yourself-Park of "W" crocks (those tanks declared beyond repair). After this source ran out, mild steel from the steel mills in the south of Caen was tried. The Navy also complained at this time that Canadian soldiers were cutting pieces of plating out of craft stranded on the beaches. Major Wiggan recorded in his War Diary that "An examination of steel plate in wrecked naval vessels and from the Schneider Steel Works in Caen showed that metal to be unsuitable." Hence it was necessary to fall back on mild steel plate welded over the openings in the form of spaced armour, that is, one plate welded over the opening from the outside and a second plate welded over the opening from the inside. The gaps between the plates were filled with sand.[22]

All carriers were completed on time by 2000 hours on the 5th. In addition, 6 more were ready by noon on the 6th.[22] Lieutenant-General H.D.G. Crerar, GOC 1st Canadian Army, telephoned his thanks and congratulations to Brigadier Grant in the afternoon of the 5th and asked him to convey these to all the officers and men responsible for doing such a splendid job in so short a time. Major Wiggan was appointed a Member of the Order of the British Empire.

The British press and the BBC on their 9:00 pm news on the 8th announced that in the latest attack, the Canadians used APCs specially-made in the field for the operation. But maintaining the Kangaroos in battle was a different story, as we shall see later.

WASP Flamethrowers. Just after lunch on 12 August Brigadier Grant received a request from the General Staff to arrange for the immediate installation of Wasp Flamethrowers on 36 Universal Carriers. The deadline was 1800 hours the following day, thirty hours away. The work was to be done by 2 Infantry Troops Workshop under the direction of CREME 1st Army Troops. The data used in organizing the production line was to come came from the Directorate of Chemical Warfare and Smoke (DCW & S). Ordnance was to supply the carriers and kits.[23]

The kits arrived early in the evening but the carriers were not delivered until 2300 hours. At this time Brigadier Grant was advised that the requirement had been reduced to 12 carriers but that armour plate must be added to the front of them. This change was not sent to the workshop until 0900 hours the next morning.

Meanwhile the workshop had started work at first light on all 36 carriers. The production line was organized in two sections each with 18 carriers. The 72 tradesmen were divided into two teams. The work was divided into stages but organized so that the work of one team was inspected and tested by the other team.

By 0900, after two hours work, the first phase of the work was completed and the teams were ready to change sections when an officer from DCW & S arrived with the news of yet another change in plans. Now only 12 completed carriers were required but the deadline was advanced to noontime!

Brigadier Grant's instructions now arrived at the workshop. The CREME realized at once the urgency of the program and immediately arranged for the workshop to make a template and cut the required armour plate for the carriers. He rearranged the organization of the tradesmen in order to concentrate on producing 12 vehicles by the noon deadline. The remaining tradesmen were put to work on the remaining 24 vehicles.

But another problem now arose. The tradesmen, checking oil levels of the engines, transmissions and differentials, discovered that the lubrication charts had not been followed and that, as a result, many of those components contained oils that were not chemically compatible with the standard oil specified for field use. The tradesmen checking the tracks found that a large number of them had an incorrect number of track links. The majority of the carriers were Mk IIs instead of MK Is, causing considerable extra drilling and cutting of armour plate before the Wasp kits that were designed for Mk I carriers could be installed. The final and probably the most exasperating difficulty was the discovery that the nuts and bolts supplied with the kits were a mixture of American and British thread systems.

These difficulties, combined, made it impossible to meet the deadline. The first three conversions were ready by 1500 hours and DCW & S personnel immediately

22. War Diary 2 Tk Tps Wksp (Hodgson, op.cit., page 568).
23. War Diary DDEME 1 Cdn Army (Hodgson, op.cit., pages 570 & 573).

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began to train user personnel in their operation.

Word was received at 1700 hours that an additional four conversions were required that day, raising the total to 16. The first 12 were completed and tested by 1830 hours and the additional 4 an hour later. The remaining 20 were delivered by 1700 hours on the 14th, fifty-three hours after Brigadier Grant received his request.

Brigadier Grant noted in his War Diary that, "The number of conflicting orders and the manner in which they affected the workshop slowed production materially. It clearly shows the necessity for using the proper channels of communications. Had the General Staff cleared all requirements through DDME (First Cdn Army) instead of relaying it to the workshop through personnel of DCW & S, much confusion and resulting delay would have been avoided."

The Wasp Flamethrowers were successfully put into action. On the 14th the Storemont, Dundas and Glengary Highlanders attacked a German position with a section of three Wasps. The German position included four machine guns and a Tiger tank. The position was quickly overrun and 250 prisoners were taken. There were no Wasp casualties.[24]

Armour Protection for M10s. During the first week of August, 45 LAD attached to 5th Anti-tank Regiment carried out a field modification to the regiment's 24 M10 self-propelled anti-tank guns (a 3-inch high velocity gun mounted on a Sherman tank hull). The guns were withdrawn from action a few at a time to the LAD located in a farmyard in the unit's forward area. Here they were fitted with covers to provide overhead protection for the crews. This important improvisation was quickly designed and skilfully constructed by the LAD's craftsmen using ¼-inch steel boiler plate obtained from the ruins of a nearby locomotive works. The covers proved highly satisfactory and remained in use throughout the campaign. However, there was a price. The LAD was one of those units in the forward areas mistakenly bombed by Allied planes on August 8th. One bomb landed in the farmyard killing Artificer-Quartermaster-Sergeant (Warrant Officer Class Two) G.A. Newsome[25] and Craftsman F.S. Runnels.[18]

AWDs for AGRA. The organization of artillery in 21st Army Group at this time provided divisional artillery (usually three field regiments with 25-pounders) and support artillery which was formed as Army Group Royal Artillery (AGRA) and equipped with 4.5-inch or 5.5-inch medium guns. The AGRAs could be allotted at corps or army level in varying numbers to suit the operations. This caused a problem, however, because AGRAs did not have accompanying second-line resources. Therefore, when an AGRA was not under command of a corps headquarters the corps troops workshop was overstaffed in gun personnel, and when more than one AGRA was under command of an army headquarters the army troops workshop was understaffed.[23]

The problem came to a head during the build-up for the breakout from Caen during the latter part of July 1944. 9th British AGRA and 2nd Canadian AGRA came under command of 2nd Canadian Corps. The Corps' DDME, Colonel M.C.G. Meighen, anticipating a heavy workload in the AGRA area, formed two AWDs;

one for the support of each artillery group.[26] No. 1 AWD, made up of 35 technicians of the armament section of 2 Corps Troops Workshop, supported the Canadian AGRA, while No. 2 AWD, made up of 45 technicians from 1 Army Troops Workshop, supported the British AGRA. When, after the Falaise battles, the British AGRA was preparing to leave the Canadian Corps, it was recorded that "their AWD" was packed and ready to move off with their new-found friends![27]

On 20 July, 2nd Canadian AGRA HQ and its AWD area were south of the River Orne in what was considered to be a forward position. Colonel Meighen had decided that although the AGRA was rather far forward, the AWD, in order to be effective, had to move with the AGRA it supported. Thus the AWD with its complement of machinery trucks set up shop and operated in a closed street in Faubourg de Vaucelles. The DDME's assessment of the dangers of the location, however, proved to be entirely correct. On July a machinery truck was destroyed by a direct hit, with the flying metal wounding two tradesmen.[27]

Each AWD was normally able to repair four guns a day and a limited number of radios and instruments. However, when the two AGRAs were bombed in error on 8 August and 14 August during

24. Sorensen, Capt H.; *Flame Development and Operations in World War II*; unpublished report, 1944; Section 6, Appendix A
25. Savage, Major J.M.; *The History of the 5th Canadian Antitank Regiment*; privately published, 1945; page 24.
26. See also Chapter 3 for Divisional Gun Shop Detachment.
27. War Diary DDEME 2 Cdn Corps (Hodgson, op.cit., page 570).

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Operations TOTALIZE and TRACTABLE, several guns were lost or damaged and many men were killed or wounded. The AWDs had been working strenuously doing normal maintenance programs during the heavy firing programs of these two operations. Consequently they had to redouble their efforts, artillery support being vital to the operation. All guns were inspected or repaired within a day.

As the campaign developed during the pursuit to the Seine and Channel ports, the lengthening L of C, the lack of proper ports and the low priority given to backloading of repairables soon stretched the administrative resources to the limit.[2] This created engineering problems that demanded technical solutions - which had to be carefully worked out in the chaos of rapid advance and limited resupply. It was engineering with logistic limitation. Technical and organizational excellence and efficiency were of the essence. Some examples include; tire and tube repair, cannibalization, recovery operations and AFV repair.

Engineering with Logistic Limitations

Tire and Tube Repair. In Normandy, anti-personnel bombs and shrapnel caused mounting damage to tires. The synthetic rubber tires had poor penetration resistance to the flint stone in the area. It was soon realized that something had to be done locally before the resupply problem became unsurmountable. Surveys were made of known garages to gather up vulcanizing equipment and rubber in an effort to increase the workshops' capacity for these repairs. Regrettably, this was not successful. The larger garages located in Caen, for instance, had been completely destroyed by bombing.[28]

In the late summer of 1944 it became apparent that arrangements would have to be made to repair tires and tubes in the theatre for 21 Army Group. To this end a British mobile tire repair unit was mobilized and sent to France.[29]

Equipment for a second such British unit was also prepared. However, because of the shortage of trained tire maintenance mechanics in the British Army, it was decided to raise a Canadian unit which would use the British equipment. Thus 1 Canadian Mobile Tire Repair Unit was formed on 17 November 1944 from the tire mechanics of 1 Canadian Base Workshop. The unit was commanded by Captain A.L. Maclean and was on the continent and in full production by January 1945. Operating on the 21st Army Group L of C, it had an establishment of 50. At its peak it had 70 Canadian military, 75 British military and 100 Belgian civilians. Although designed to be mobile, once on the continent the unit remained located at Boortmeerbeek, Belgium, about 12 miles east of Brussels. By late January the British unit was moved to the vicinity and combined with the Canadian unit under Captain MacLean's command.

For the last three months of the war the combined units worked at peak production, repairing or retreading 700 tires and 1,000 tubes per week. For the eight months that the units operated, 20,000 tires and 35,000 tubes were repaired or retreaded.

Cannibalization. At the start of the Northwest Europe campaign the lack of spare parts was a problem. On D-Day, losses and scattering of spare parts hampered production of the beach recovery sections. In order to bolster up the supply of serviceable assemblies for the repair of tanks in the bridgehead, 3 Infantry Troops Workshop was assigned to removing all such components from the "W" Crocks which had been placed in a Help Yourself Park. Twenty percent of all the spares used in early stages of the campaign came from this source. This also helped to clear up the bridgehead area.

The problem of spare parts was particularly important for the 25 Canadian Armoured Delivery Regiment (The Elgin Regiment). The unit's role was to provide units in battle with replacement tanks and crews. Consequently it had detachments well forward with replacement tanks. Captain G.W. Procunier attached to E Squadron noted, "that in accepting the concept that the chief role of the LAD was to maintain maximum availability of equipment one should also accept the concept that there would be times when using parts of disabled vehicles was justified. There were numerous occasions, particularly after long heavy engagements when many tanks were knocked out and spare parts were depleted."[30] In other words: because of physical limitations, costs and the uncertainties of war, the supply system could not pre-position adequate stocks.

During the autumn of 1944, when supply lines had been established, the problem of cannibalization

28. Hodgson, op.cit., page 566.
29. War Diary 1 Cdn Mobile Tire Repair Unit (Hodgson, op.cit., pages 301 & 588).
30. Procunier, Capt G.W.; letter to the author, 1994.

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(uncontrolled reclamation of serviceable components from damaged equipment) continued. The problem was that real repair parts usage was not being reported and, hence, scales were too low. Tank batteries, Homelite generators and Canadian-built 19 Wireless Sets were the main culprits. Unsuccessful attempts were made to enforce reclamation and stamp out cannibalization. Colonel Meighen, DDME 2nd Canadian Corps, analysed the problem, "Drivers do not carry extra generators and carburetters for the fun of it. Armoured Regiments, LADs and even second-line workshops do not remove tracks, bogies, etc, from one derelict tank to enable another tank to operate either because they are lazy or mischievous. It takes extra effort to do so ...the driver carries a carburetter and a generator because he feels he is going to need one and has no confidence normal supply will make these available when required. Tracks, bogies, etc, are removed from one tank to make a runner of another. They would obviously prefer to get these articles from Ordnance if such were available. Is not the answer to increase the supply of those articles most frequently cannibalized?"[27]

Colonel Meighen was commenting on the question of taking disciplinary action to stop cannibalization. However, as he noted, the only way to stop cannibalization was to provide the required parts when and where needed. The Repair Parts Scaling Section, started at 202 Base Workshop in the early 1950s, was a direct response to this problem.

Recovery Operations. Prior to the break out of the Normandy bridgehead and later during the pursuit period, there was little recovery allowed other than at brigade and regimental levels. During these critical periods, in order to keep the routes clear for the forward movement of the formations and supplies, no backloading or evacuation of vehicle equipment casualties was permitted until semi-static conditions were achieved. Consequently, recovery in 1st Canadian Army area did not develop into an organized system until after the closing of the Falaise Gap on 21 August. At that time 3 Recovery Company progressively took over the Corps' collecting points and traffic commitments from 2 Canadian Recovery Company. This released the latter's equipment for operations closer to the front.[27]

Keeping routes clear - particularly in the forward areas - was often the task of the 2 Canadian Recovery Company. For example; from 18 to 25 April 1945, Sergeant L.A. Slumkofske was in charge of a special recovery detachment at a bridgehead over the Rustenkan Canal. His detachment included two tank transporters, two caterpillar D-8 tractors, a carrier and nine Craftsmen. His task was to keep open a narrow muddy road from the main road to the canal. Many of the tanks and other armoured vehicles were bogged down a good distance from the road. Throughout the operation the detachment was under shell, mortar and rocket fire. The detachment worked in the open in unarmoured vehicles and on several occasions tasks had to be carried out within the bridgehead itself. By borrowing vehicles, constantly encouraging his men and efficiently organizing the work it was possible to recover as many as six vehicles, including four tanks, from deep boggy ground in one day. The outstanding efficiency with which the detachment carried out their task was a material contribution to the success of the operation. Sergeant Slumkofske was awarded the Military Medal.[31]

Buffalo amphibious vehicles were the key to success in the many river and canal crossings. All efforts were made to protect and maintain this valuable equipment. For example on 11 February 1945, Sergeant M.C. Roulston of 2 Canadian Recovery Company was with a convoy that had just delivered 12 Buffaloes for a river crossing near Nijmegen. The convoy of twelve transporters was halted by traffic congestion near the town of Gennep and came under mortar fire causing the transporter crews to leave their vehicles and seek cover. One crew member was killed and two wounded. Realizing that the convoy was an ideal target and attracting fire, Sergeant Roulston left his vehicle and rallied the 48 drivers and crews. He organized and encouraged them to return to their transporters. Although exposed to enemy fire, he succeeded in getting the convoy rolling. He also checked on the condition of the wounded to ensure that no harm would result from moving them. His action prevented destruction of valuable transporter equipment and was instrumental in keeping a vital road to the front clear. Sergeant Roulston was awarded the Military Medal.[32]

In France, the crowded conditions of the Normandy bridgehead and the rapid advances of the Allied formations stretched out the supply lines to such an extent that by the middle of September 21 Army Group's L of C had lengthened to three hundred miles - double the distance on which the allotment of

31. Sgt Slumkofske's citation.
32. Sgt Roulston's citation.

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transport had been calculated. Therefore, until port facilities (especially Antwerp) and rail facilities were developed, the road maintenance lift had to be increased by every possible means.[27] This created unexpected problems.

The consumption of gasoline was so enormous that the greater part of the supply transport was used to bring it forward from the rear installations. Air transport was used to the maximum and some units had to be temporarily stripped of part of their transport in order to support the forward units whose momentum of advance had to be maintained.[27] Even tank transporters were used. Nearly all of the Corps' forty-three 40-ton tank transporters were converted to use as load carriers. Each one could carry 16 tons of supplies, 36 tons of ammunition or 500 jerry-cans of gasoline; a considerable increase in transport capability.

This increase was required to maintain the momentum of the advance - but there was a trade-off. The forward flow of spare parts was hindered, resulting in the previously-discussed problem of cannibalization. The rearward flow of tanks for repair was also hindered, causing overhaul workshops to be located too far forward for efficient production.

An interesting sidelight to the efforts of carrying gasoline forward was the construction of pipelines. On 5 September 1944, however, one pipeline near Canon in France started to leak. Personnel from Captain G.H. Marton's 125 LAD supporting L of C Signals turned out to attempt to stop the leak. They were successful in what was definitely an unusual repair request.[33]

AFV Repair. The problem of third and fourth-line repair of tanks was a difficult problem. Tanks abandoned or damaged on the battlefield suffered the ravages of sabotage (by the Germans) and cannibalization. By the time the tank casualties reached the third-line workshops, they could be - and often were - badly depleted in addition to being damaged.[33]

When 1st Canadian Corps was wintering on the Maas, the demand for tanks was high because regiments were endeavouring to get back to full strength in preparation for the spring offensive. The demand for a high production rate created sufficient pressure for the quality of the output from the third-line workshops to drop below a level acceptable to the inspectors of 1 Canadian Section AFV Inspectorate commanded by a Major E.A. Perry.

Something had to be done quickly to improve the quantity and quality of third-line output. Consequently, 3 British AFV Servicing Unit, located in Antwerp and on loan to 1st Canadian Army, was brought forward and melded in with the armoured delivery squadrons.

The role of the Servicing Unit, commanded by RCEME officer Major K. Case, was primarily inspection, adjusting, modifying and making first-line repairs, thus relieving the third-line workshops of work for which they were not established. The daily quota of serviced tanks was set at a minimum of ten. The quota was only occasionally met, the average being five.

Why was production so disappointing? There were several reasons. Major Case noted that under the 21st Army Group he had access to Base Depots but under Canadian command he had to obtain parts through Canadian channels. Less than 10 percent of his requirements could be met and production practically stopped. After several weeks' argument he was permitted to return to his former supply system.

Another problem was due to the rudimentary design of the tanks. Once out of preservation, the tanks were vulnerable to the cold and wet of the winter months. This was particularly true of the electrical system. An idle tank could become inoperative after a week's exposure to a damp atmosphere.

As rugged as a tank appeared, it would not stand much misuse or abuse and there were too many mechanisms that had to be kept properly adjusted at all times. Although most equipments were initially issued with a service manual such manuals were next to impossible to obtain in the field. Service manuals for British equipments were generally not well prepared in contrast to American manuals. The project management system used today is a direct response to these problems.

Organization of RCEME

The Normandy landing included unit mechanics and first-line LADs as well as second-line brigade workshops. The third-line workshops were in action by the end of June and the first of the two advanced base workshops moved in the next week. A month after D-Day, the final battle for Caen had been started ten miles south of the beaches at Courseulles. Compressed in this short distance were three echelons of RCEME

33. War Diary 125 LAD (Hodgson, op.cit., page 576).

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in action and the fourth echelon was setting up shop near Bayeux, a mere fifteen miles away to the west. It was a time where strong control was required to make the best use of the 3,000 technicians struggling to recover, repair or replace the battle-torn equipment of two divisions in constant battle with the enemy and trying to build up for the crucible at Caen.

As the Falaise gap was being closed in late August 1944, the RCEME organization had expanded to 7,000, six times the 1,200 who had landed in those first few days in June. By the end of the campaign these four echelons were stretched over hundreds of miles and included recovery companies, specialist units such as a radar battery workshop and a LAD for the Canadian APC regiment. All told, there were about 150 RCEME units ranging from 30-men LADs to 500-men advance base workshops. They used types of equipment ranging from an armourer's tool box to a tire moulding machine, from a LAD officer's armoured car to a tank transporter.

These RCEME units included 100 first-line LADs or LAA workshops. Approximately 70 were located in the forward areas with front line units or brigade or divisional headquarters. The remaining 30 supported rear area units or headquarters. Fifteen of the eighteen second-line workshops were in the forward divisional areas. The other three, plus the six third-line workshops and the two fourth-line workshops were in the rear areas.

As the campaign developed, some specialist RCEME units had to be established, such as: 1 Canadian Mobile Tire Repair Unit, 1 Canadian Port Workshop, two L of C telecommunication workshops and three recovery companies. In addition, the many new types of specialist combat or combat support units required first-line support. Therefore LADs were established for 1st Canadian APC Regiment, 1st Rocket Battery and 25th Armoured Delivery Regiment. When 1st Radar Battery was formed it had its own workshop, as did the two engineer equipment regiments.

There were approximately 11,000 in this RCEME organization. Of this number, about 5,500 were engaged in first and second-line repairs or recovery in the forward areas in divisional workshops or front line unit LADs. 1,500 served in third-line workshops and 1,000 served in fourth-line advanced base workshops. The remaining 3,000 served in the rear area first- or second-line workshops, specialist workshops or the three recovery companies.

Control of this group rested with the DDME (Army), Brigadier G.M. Grant. Direct technical command of the RCEME units rested with the eight CREMEs at divisional headquarters and at corps and army troops areas. DDME (Army) controlled these CREMEs directly or through either of the two DDMEs (Corps), Colonel J.W. Bishop or Colonel M.C.G. Meighen (later Colonel D.N. Cooke). The staff organization supporting them comprised 80 officers plus support staff. Half were at brigade and divisional headquarters, the other half at corps and army headquarters.

In this RCEME organization there were about 500 officers and 2,500 storemen, clerks, cooks, drivers and general duties personnel. Hence, it was the 1,000 artificers and the 7,000 artisans, mechanics, fitters, blacksmiths, welders and electricians who were the working tradesmen in the RCEME units. In addition, 150 of the fighting units had 3,000 unit mechanics or armourers on strength. Their work had to be coordinated with RCEME units.

Throughout the campaign careful coordination of tasks and refinement of procedures were required by the various headquarters staffs for all aspects of RCEME, which included movement and control of workshops and trades skills at all levels of RCEME operations.

RCEME Operations

Fourth-line Workshops. 1 Canadian Base Workshop did not leave the UK. Fourth-line service was provided in the field by 1 and 2 Advanced Base Workshops which were placed under the control of the DME, 21 Army Group, thus placing all the fourth-line workshops under one command.

The successful movement of an advanced base workshop required maximum skill and planning, as it was every bit as complex as moving the equipment of a factory from one site to another - with the additional hazards of sabotage and perilous transportation.

The two Canadian workshops moved from Normandy to Belgium once suitable locations were found. 1 Advanced Base Workshop set up in a factory in Machelen, a small town between Vilvorde and Brussels and 2 set up in a factory in Antwerp. They remained in these sites for the remainder of their stay in

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Europe.[33]

Third-line Workshops. Once the Falaise gap had been closed and the pursuit to the Channel ports had begun, the frequency of workshop movement increased, the rate of wear (particularly in the running gear of the combat vehicles) increased, the demand for recovery of vehicles and equipments of all kinds increased, and the availability of spare parts was reduced. This focused attention on the problem of how to get maximum output from a third-line workshop and keep it close to the formation it supported during a rapid advance. In order to get a good output, the workshop had to remain on its site for a reasonable period. But if this was done, the distance between the workshop and the formation it supported became too great for effective administration by Corps.

The British solution to this vexing problem was to keep their third-line workshops every bit as mobile as brigade workshops. One of their third-line workshops was able to move on 36-hours notice. A recovery section always moved with them, carrying as many spare parts as possible, to counteract the difficulty the supply system was experiencing in making issues over such distances.[33] However, this approach consisted of short, and thus inefficient, work periods sandwiched between and added to the lost time caused by the frequent closing, moving and reopening of a workshop in a new site.

The overall rate of increase in the workload experienced in the breakout from the Normandy bridgehead and the predicted continued rate of increase made it obvious that the third-line workshops had to remain longer at each site if their potential productivity was to be attained. The resulting distances between the workshops and their formations made it difficult for the Corps to administer them during a rapid advance. This suggested that third-line workshops should be administered by Army. Consequently, on 1 September 1944, all third-line workshops were passed to the command and control of the DDME 1st Canadian Army except for specific tasks.[23]

The Canadian solution increased flexibility. As the campaign progressed, third-line workshops were leap-frogged from rear army areas to rear corps areas under Army Headquarters control and with minimum interruption in production. Centralized control placed repair facilities as far forward as necessary to meet the dictates of battle.

Second-line Workshops. The second-line workshops or brigade workshops within a division were not fully mobile nor were their productive capacities readily available to the brigade commanders. The normal brigade workshop site after the Normandy campaign was located in the divisional administrative area many miles to the rear of the rapidly-advancing brigades. For example, 4th Canadian Armoured Brigade Workshop was as much as 60 miles behind its brigade. Such great distances made it impractical if not impossible to move the Brigade's tanks requiring workshop repair to the rear and, alternatively, the Brigade area was too far away for the efficient operation of an AWD. Lieutenant-Colonel R.H. Noble, CREME 4th Armoured Division, consequently arranged to have his brigade workshops brought forward to the brigade A echelon areas and leave a rear workshop detachment (RWD) to service the B echelon areas in the Divisional Administrative area. The RWD was constituted as a normal AWD.

With the new policy approved, Colonel Noble's two brigade workshops moved forward with the division's rear headquarters for the first time in the campaign on 4 September and crossed the Somme at Pont Remy to sites near Ballancourt. During the static role of the Division that winter the brigade workshops were within a mile or two of the regiments they served.

Each infantry division had three brigade workshops. Its solution to the problem was essentially the same as that of the armoured division. One workshop was placed up ahead of the divisional administrative area to support all the units in its vicinity while the other two workshops remained in the administrative area to clear up work left behind from the advance.

These brigade workshops were usually quite close to the battle areas. For example, in the early afternoon on December 19, 1944 enemy shells commenced falling on 6 Canadian Infantry Brigade Workshop located near Nijmegen. The first shells instantly set fire to several vehicles and damaged the building. Craftsman W. Olechowski immediately attacked the flames and, by his action, encouraged other soldiers in the vicinity to quickly follow his lead, despite the fact that other shells were exploding in the immediate area. He then entered a 15-cwt vehicle which was burning and loaded with exploding small arms ammunition. After much difficulty, due to smoke and heat, he succeeded in driving the vehicle out of the workshop and on to a roadway where it became a total loss. His unhesitating action assisted in saving other

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vehicles in the shop from total destruction, in localizing the fire, and in preventing further loss of valuable workshop equipment. Craftsman Olechowski was awarded the Military Medal.[34]

First-line Workshops (LADs) of Armoured Regiments. The movement and control of armoured regiment LADs were influenced by the regiment's CO, his technical adjutant and the LAD's OC. These LADs, in reality the headquarters' portion of today's armoured regiment maintenance troop, had an establishment of twenty-five all ranks, five trucks, a welding vehicle and two breakdown trucks. The two regimental armourers and crews for the three ARVs were RCEME but on regimental establishment as were the ARVs and were controlled by the technical adjutant. The main battlefield tasks were recovery and *in situ* light repairs and welding. The resources for these were divided between technical adjutant and the OC of the LAD.

Before D-Day, the stores portion of the LAD, two vehicles, moved with the regiment's rear administration (B Ech) group in the Divisional Administration area. The remainder of the LAD was located in the regiment's forward administration (A2 Ech) group. Forward of that, in A1 Echelon, was the technical adjutant, with his crew of regimental mechanics who followed close behind the regiment's combat elements (F Ech) comprising the three tank squadrons and regimental headquarters. The regimental mechanics and armourers spent most of their time with the tanks prior to crossing start lines and then rendered aid as required. The LAD could contribute very little to combat fitness of the regiment at the times most required, just before and during battle.

As a result of D-Day experience, the LAD's welding truck was moved forward to A1 Ech and the remainder of the LAD was moved to A2 Ech. The technical adjutant and LAD commander divided all duties between them. In battle they could relieve each other. Normally, the technical adjutant worked forward on battlefield recovery, repair and welding. The LAD commander followed and was responsible for route recovery, workshop liaison, spare parts and inspection of reinforcement vehicles.[35]

The reconnaissance and recovery elements of the armoured regiment LADs worked with the forward tanks so as to ensure that damaged or stuck tanks were repaired or recovered without delay. This often brought them into direct contact with the enemy. During the advance into Bruges on 8 September 1944, Armament-Quarter-Master-Sergeant (Warrant Officer Class 2) H.S. Revill was with the leading element of the British Columbia Regiment. He was shot by a sniper at one of the city's gates and Belgian civilians who were hiding in nearby buildings took him in. As the battle for Bruges raged they cared for him, even arranging for him to be carried through the "no-man's land" to receive treatment in a hospital from a doctor. Despite this care he died on October 3rd. Four days later the townsfolk gave him an impressive military funeral in the city cathedral "to pay the last honour to this heroic Canadian as well as to remember all the Canadians who had sacrificed their lives for our Freedom."[36,37] Warrant Officer Revill was Mentioned in Dispatches, awarded posthumously the Croix de Geurre of Belgium, and is one of seven of Canada's Craftsmen who are buried in Adegem Canadian War Cemetery.

In the short four-month time from landing in Normandy to the early part of September, many changes in the operation, movement and control of mobile workshops were created as a result of battle experience.

Trades Skills. The success of RCEME, however, was due not only to good organization but also the trades skills of individual craftsmen. Trades training, however, was a rather informal and unstructured arrangement in the first-line units, as noted by Captain A. Gusen, commander of several of these units including 2 LAA Workshop, 32 LAD (artillery) and 18 LAD (brigade HQ). But there was always a nucleus of experienced tradesmen around and they guided the less-skilled and less-experienced tradesmen. Of great help, too, in these forward units were EMERs (see page 81), which were issued regularly and gave defect and modification notification on all types of equipment, particularly guns and vehicles.

Some factory technical representatives were able to get forward to help too. In one session at 4 Armoured Brigade Workshop, two civilians from General Motors gave a two-day presentation on servicing the hydromatic transmissions in the General Stuart light tanks, which were powered by Oldsmobile engines. Rotation of mechanics through the rear area workshops, trades training and trades testing were also used to

34. Cfn Olechowski's Citation.
35. Hodgson, op.cit., page 574.
36. War Diary the British Columbia Regiment.
37. Spittael, Mr. G.; Belgian author, extracts from his files, 1992.

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maintain trades skills. However, as Captain Gusen also noted, a tremendous asset was the civilian experience of the many mechanics who had come from prairie farms where they had to be handy in a number of skills.[38]

Inventiveness complemented experience and organization for Canada's Craftsmen and they compiled an impressive record with front line units, in divisional workshops, in Corps and Army rear areas, and along the lines of communication.

With the Front Line Units

During the fierce fighting in Normandy and the build-up for the breakout battle, the LADs were often located right up front with units they supported, sharing the danger, the work and the casualties. On D-plus-2, 34 LAD attached to 14th Field Regiment was located with regimental headquarters only a few hundred yards behind the guns. In order to relieve the gunners and drivers who were loading ammunition, who had been on the go almost continually since they had landed and were nearly exhausted, the entire LAD stood guard duty. During the evening of 30 July, 62 LAD attached to the 17th Duke of York's Royal Canadian Hussars suddenly came under air burst shell-fire south of Caen. Staff-Sergeant Rose was seriously injured and two others were also hurt. Lance-Corporal W.W. Cromwell showed great coolness in tending to the wounded during the shelling and probably prevented Staff-Sergeant Rose's death from loss of blood.[39]

On a few occasions during the furious fighting near Falaise, Allied bombers accidentally bombed Allied units. Many LADs, being far forward, suffered with their units. In one of these attacks in early August the artillery LADs of 4th Canadian Armoured Division suffered 7 casualties to LAD personnel of whom 3 were killed. There were also several vehicle casualties to LAD equipment which represented a ten per cent loss.[40]

The historian of 22 LAD attached to 5th Field Regiment summed up the ferocity of the Normandy battles when he wrote, "After Caen, we saw the main battle field. Canadian and German dead were on the ground, black from the hot sun under which they had lain for several days, guns and vehicles were knocked out everywhere. The breakdown crew found plenty of work."[41]

The tradesmen in the LADs often worked with and inspired soldiers in action. For example, on 6 August 1944 at Cormelle, Normandy, Corporal G.A. Gill, a fitter with the 28 LAD attached to 7 Canadian Medium Regiment, was called to a gun position to carry out repairs to guns that had been temporarily disabled by heavy enemy shelling. Despite the continued shelling of the position and with utter disregard for his own safety, this NCO successfully repaired the guns enabling them to be put back into action at a time when they were most needed. On August 12th he was called to repair disabled guns under a heavy bombing attack. He showed great determination and courage and helped maintain the morale of the men at the gun position with his coolness and determination. He was an inspiration to all the men who worked with him. Corporal Gill was awarded the Military Medal.[42]

Frequently in battle it was the RCEME fitters in armoured recovery vehicles who brought forward ammunition and food to soldiers isolated in small pockets after attacks in the no-man's land of contested territory between the lines. For example, on 26 February 1945, B Squadron 27 Canadian Armoured Regiment was in support of the South Saskatchewan Regiment on the high ground near Calcar. There were a number of enemy pockets left behind which had been by-passed by the regiment's attack the night before. It was impossible for any wheeled vehicles to bring up supplies during the day due to the boggy condition of the ground and the fire brought to bear by the by-passed enemy. In addition, all routes forward were under heavy enemy artillery and mortar fire. As the Squadron Leader moved from place to place directing the battle, his tank bogged down and no other tank of his squadron could come to his assistance as they were busily engaged with the enemy.

In answer to the call for recovery, Sergeant E.F. Sodeman of 85 LAD attached to the regiment, arrived and with his recovery tank pulled out the bogged-down tank. Learning from the Squadron leader that, it might be necessary to disengage from the battle due to lack of ammunition and petrol, Sergeant Sodeman volunteered to bring these forward in his recovery tanks. This was extremely difficult due to the soft ground and the constant fire being brought to bear by the by-passed enemy. As soon as the enemy realized what he

38. Gusen, Capt A.; letter to the author, 1982.
39. RCEME Unit Histories, op.cit., Chap VII.
40. RCEME Unit Histories, op.cit., Chap VIII.
41. RCEME Unit Histories, op.cit., Chap VI.
42. Cpl Gill's citation.

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was up to, they immediately brought down a terrific concentration of artillery and mortar fire. Not only were these trips made extremely dangerous by this fire but twice his tanks became bogged and he had to direct and recover them in full view of the enemy. He never wavered in the face of all these difficulties and managed during the afternoon to make three trips back and forth in spite of every effort the enemy made to prevent him. His determination and bravery in the face of enemy machine gun, artillery and mortar fire across open boggy country was an inspiration to our forces on the high ground and was the determining factor in bringing this operation to a successful conclusion. Sergeant Sodeman was awarded the Military Medal.[43]

As 38 LAD attached to 9th Brigade headquarters discovered, the first two weeks of operational work were very difficult, due to lack of proper facilities. Tire and radiator repairs were top-priority jobs. The supply of motors was very limited.[39] 19 LAD attached to 4th Field Regiment found the same problem and much of the repair work had to be carried out in trenches because of the shelling.[41] At one stage of the battle for the high ground before Falaise, one of the recovery tanks of 54 LAD attached to 1st Hussars ventured out at night to retrieve a tank which was about 400 yards ahead of the FDLs. As the recovery tank neared the disabled tank, the enemy suddenly illuminated the area with flares. After a few uncomfortable minutes, the disabled tank was hooked up. As the two tanks slowly moved away, they were followed by the angry chatter of machine guns punctuated by bursts of artillery and mortar shells from the enemy.[44]

Early in the battle it was learned that, by using old tank tracks welded to the hull, the Sherman tanks could be given additional armour protection. In 42 LAD attached to the South Alberta Regiment, this was first used in Caen on 1 August, using tracks from knocked out Tiger tanks. At least one recovery vehicle was kept busy hauling in tracks all the time. This work was carried out on every new tank received by the regiment during the campaign. LAD's welders spent many long hours at various times doing this work but had the satisfaction of knowing it helped the tank crews.[40]

As a result of the confusion on the beaches of Normandy, the complete lack of spare parts rendered anything but patching and temporary repairs out of the question. Most of the casualties were well beyond the capability of 55 LAD attached to the Fort Garry Horse. After D-plus-2, brew ups ceased to be the only casualties and there arose a demand for fast moving parts. Thus cannibalization became a necessity and it finally became necessary to assign an NCO and two men as a permanent scrounging crew in order to keep equipment running. While the practice was necessary, as the unit historian noted, it was unfortunate that it wasn't more carefully controlled in the early days. Abandoned equipment which was not very seriously damaged was strewn all over the country. Components were removed with no thought given to damage caused to neighbouring ones. There were facilities available for concentrating all this equipment in guarded parks. It would have saved the LAD time and manpower to have contributed some men to form a special staff for the systematic stripping of equipment and preparation and preservation of components.[44]

Modification of equipment in the field was often a challenge given to the LADs. One job that confronted 23 LAD attached to 3rd Field Park Company was on the engines of the Water Purification sets. These were originally equipped with Petter engines, which gave continual trouble. In addition, the supply of Petter parts was practically non-existent. After much discussion it was decided to revamp the mountings and install Jeep engines. This work was done by the workshops and proved a successful. These units had no further trouble and often pumped as much as 50,000 gallons per day compared to the 30,000 gallon maximum of the original set.[41]

During the clearing of the Scheldt in the fall of 1944, 38 LAD which was supporting Headquarters 9th Brigade, went into one of its most strenuous actions. The ground was a mire. Many vehicles had been knocked out by the numerous mines seeded about and parts were in very short supply. It was here that Sergeant Gibson and his recovery crew, operating with a unique universal carrier powered by a Willys engine and transmission with a Diamond-T winch performed many outstanding feats of recovery. Adding to the general difficulties of rain, mud etc, they were constantly subjected to very heavy shelling from an obstinate enemy. Later in March 1945, the "recovery-carrier" fulfilled its function in the numerous recovery problems in the soft ground and confined spaces of the Hochwald.[39]

After the fall of Boulogne and Calais, the 40 mm Bofors of the light anti-aircraft regiments began to be employed in a ground role to give close support to the infantry. 3, 4 and 8 LAA Workshops attached to

43. Sgt Sodeman's citation.
44. RCEME Unit Histories, op.cit., Chap XI.

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these regiments were busy outfitting the regiments, troop by troop, with deflection sights and range drums. 25-pounder shell cases were collected and taken to Antwerp to be remelted and cast. The rough castings were machined partly by brigade workshops and partly by the LAA workshops. They were fitted to the guns in time for action during the "Pepperpot" on 7 February 1945, and everyone was satisfied with the performance.[39]

At the time of the closing of the Falaise gap it was realized that the 4th Armoured Division might soon be making a quick dash across France. For this operation one problem would be communications. The American-type "A" frame was a simple and efficient method of laying telephone cables, but these frames were in short supply at that time. So 49 LAD attached to the Division's made a test frame from a few pieces of angle iron and a couple of improvised bearings to carry the shaft on which the cable drum was mounted. The whole assembly was mounted on the back of a Jeep and, with a few modifications was used exclusively on all Jeeps belonging to signals as well as to many belonging to other units. These proved to be of great assistance to signals during that operation and throughout the remainder of the campaign.[40]

In the Divisional Workshops

The first few weeks for 8th Infantry Brigade Workshop were spent in relative peace and quiet in muddy foxholes not far from the beaches. The men worked from dawn to dusk de-waterproofing vehicles, dismantling and draining petrol tanks and drying distributors. They put up to 100 drowned vehicles a day back on the road as runners. As might be expected, meal hours were when time could be found. German planes were overhead nearly every night, strafing and bombing and, as the unit historian noted dryly, "providing the day's recreation." On 12 July the workshop moved five miles inland and spent nearly a week busily repairing vehicles and guns that had been damaged by enemy action in the fight for Caen.[39]

During the very fierce fighting in the drive to close the Falaise gap, casualties to men and equipment of 2nd Infantry Division were high. Work was being turned out in the division's 4th Infantry Brigade Workshop at the average rate of 20-25 jobs a day Enemy planes were over every night and anti-personnel bombs were dropped in the immediate area five nights in a row. This deprived the men of much-needed rest but the volume of repairs carried out did not slacken. A further handicap was an epidemic of dysentery which plagued the unit until the end of September. The unit's work was not confined to repair and maintenance alone. On one occasion they delivered all their Brens, PlATs, and forty rifles to the Fusiliers Mont-Royal due to short supply of these items at that time. On another occasion they had to despatch a burying party to assist a padre in burying the hundreds of dead at St Andre sur-Orne.[41]

During the crossing of the Orne River at Caen only two bridges were available and no recovery rearwards across the river was permitted, so an AWD from 5th Infantry Brigade Workshop was sent across the river to Faubourg de Vaucelles to take care of all of the Brigade's forward casualties. A special AWD composed of the Brigade's LAD was extremely busy at this time. The OC, Captain A.L. Sentance, received a commendation for his unit's excellent service.[41]

After the long pursuit to the Scheldt, the workshops caught up to their divisions and started to clear up a heavy backlog and prepare for the Rhine crossing. Many workshops secured covered accommodation (old factories, etc.) but there were many casualties from V-1 bombs, shelling and strafing. As 7th Infantry Brigade Workshop arrived at Nijmegen it encountered concentrated enemy shelling during which six men were wounded and hospitalized. Craftsman Waterman won a Commander-in-Chief's certificate for his work in attending to the wounded while under fire.[39]

In the operations to clear the Channel ports, tanks providing infantry support suffered many casualties and extensive mine damage to suspensions and hulls. Throughout the campaign 2nd Armoured Brigade Workshop found that an AWD was very effective in reducing the time equipment was kept out of action for repairs. The size of these detachments varied to suit the volume of work, and on occasion consisted of reinforcements attached to the LAD concerned.[44] The same policy was followed by 4th Armoured Brigade Workshop, whose AWD carried the brunt of the work. It comprised men from the Workshop as well as an equal number from 10th Infantry Brigade Workshop, who carried out repairs on B vehicles and carriers. The AWD was under the command of Captain McGinnis of the infantry workshop. In spite of the many commitments the AWD still managed to bag some prisoners on more than one occasion. In one day the AWD captured some 30 Germans in a farmhouse and surrounding area.[40]

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In the battle for the Hochwald in February 1945, 2nd Infantry Division was on the left of the Canadian advance. The Division's workshops were a few miles back at Cleve but as the diarist of 6th Infantry Brigade Workshop noted, "the workshop was as near the enemy lines as it would be in its whole history. In full view of a German Observation Post, work was carried on in the street car barns of the "Cleves Strassenbahn." Vehicles and men tried to be inconspicuous as 88-mm shells dropped frequently in the area."[40] 5 Infantry Brigade Workshop was "shelled incessantly, day and night. The men stood up to it remarkably well, and in this location the workshop turned out ...the largest volume of work in its history."[41] That, perhaps, typifies the Craftsman's spirit.

The backbone of a workshop and the inspiration to the working tradesmen ^were their workshop and section Warrant Officers. For example, one of them, Armament-Quartermaster-Sergeant (Armt QMS) Warrant Officer (Class 2) L.W. Armstrong, was the senior Warrant officer in the wheeled vehicle section of 4 Canadian Armoured Brigade Workshop. During operations across the Rhine his brigade encountered very heavy going and at times the terrain was well-nigh impassable. Wheeled vehicles and carriers were continually failing due to enemy action and heavy loads, as well as conditions of mud and difficult ground. This resulted in a heavy load being placed on the wheeled vehicle section of the workshop. Armt QMS Armstrong's cheerfulness, devotion to duty and initiative kept his section going at top speed for the entire period of operations. By leadership and example he was able to keep his men working until the job-in-hand was completed, despite extreme fatigue. He contributed in large measure toward keeping the flamethrowers, carriers and wheeled vehicles of the division in the battle during that period. Never sparing himself when difficult problems had to be tackled, his ability and initiative were an outstanding contribution to the operations of the division.[45] Warrant Officer Armstrong was appointed a Member of the Order of the British Empire.

Although the Brigade Workshops were sited behind the front lines their Advanced Workshop Detachments moved with the forward troops. According to Artificer/Staff/Sergeant M.C. Stone: "Several times we found ourselves with the infantry forward patrols. We moved so fast that we would be moving into one end of town and our people would be clearing Jerry out of the other.[46] It was typical for the AWDs. Staff-Sergeant Stone worked tirelessly and, in spite of difficult conditions, enemy bombing and shelling, he and his section were able to maintain a steady flow of repaired or recovered equipment. He was awarded the British Empire Medal.[47]

With Corps and Army Troops

"Many RCEME units came under command CREME First Canadian Army Troops throughout the NW Europe Campaign. A few units were under command for only a short time while others completed the whole campaign with Army Troops. Irrespective of the length of time, the spirit of cooperation and hard work exhibited by all ranks were the two main factors for the success and high praise of RCEME services," wrote Lieutenant-Colonel G.W. Painter in his campaign summary. He also added that perhaps the most outstanding feature of RCEME operations was the foresight given to the formation of special units to service specially-formed units such as the Kangaroo Regiment, Rocket Battery, and Radar Battery, which operated under Army Troops command.[48]

The Army Troops area was so extensive that Army Troops units and Line of Communication (21 Army Group) units could not be divorced but were intermingled and often under Army Command. Hence 1 Canadian General Troops Workshop functioned as a second army troops workshop and 3 Recovery Company functioned as an army recovery company. Flexibility was needed to cope with ever-changing conditions. It revealed the unity of purpose inherent in all RCEME units.

2 Tank Troops Workshop disembarked on the Normandy beaches on 16 June 1944 being the first third-line workshop in France. The workshop was set up and work commenced on the following morning. The first tanks the unit worked on were drawn from the beach casualties and many had been hit at close range. The unit as a whole pitched in with great industry. Work that normally would have needed fourth-line facilities was accomplished in the fields of Normandy. In some cases all components were removed, the shell

45. WO2 Armstrong's citation.
46. Stone, Art/S/Sgt M.C.; letters to his son 1941-46; 9 May 1945.
47. S/Sgt Stone's BEM citation.
48. RCEME Unit Histories, op.cit., Chap II.

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holes patched up and reconditioned components installed. Tanks that were beyond the scope of this workshop were complete washouts. During this period a great deal of individual initiative was necessary to overcome unforeseen difficulties. Spare parts for items, which would normally outlast the life of the equipment but which had been damaged by shell fire, were reclaimed from crock parks. Special ancillary shops that were devoted to the reconditioning of various tank components were set up. "It was a mecca of accomplishment sans red tape from the craftsman's point of view!"[48]

4 Armoured Troops Workshop landed in France on 30 July and set up near Caen. It was a poor site and well forward. On 4 August it was bombed and strafed, resulting in twenty wounded and two killed. At the end of September the workshop was moved to Antwerp and set up in the Daimler-Benz factory. "It was the first time since their landing on the continent that the entire shop was indoors!"[48,49]

However this location was in the target area for the V-1 bombs. Night work in the shop was abruptly terminated on 30 October 1944 when a V-1 landed a mere 50 feet from the shop, destroying all blackouts and most of the roof. Casualties were heavy as scores of personnel sustained minor injuries from flying glass and 15 more seriously wounded were admitted to hospital. Three weeks later a rocket landed on a house 200 yards from the shop. The blast was terrific and destroyed most of the roof over the mess hall. The house was completely demolished. A family of three including a six months old baby was trapped in the basement. Men from the shop laboured for over two hours to remove the debris and finally rescued all three unharmed. The unit received a letter of gratitude from this family.

Throughout the campaign the third-line workshops did very little third-line work. Repairs were mainly replacement of assemblies and overflow from second-line workshops. The advantage of larger shops and fewer moves showed up in the production, e.g. one third-line workshop repaired to 700 tanks, 1,900 trucks, 120 guns, 3,000 rifles, 700 radios and 2,000 fire control instruments.

1 Engineer Equipment Workshop had been mobilized in January 1944 to carry out repairs to heavy engineer equipment. The unit landed in Normandy on 28 July. All the welders were immediately attached to the Kangaroo AWD to help convert to APCs the SP guns which had been used on the D-Day landings. At the beginning of September the workshop was moved to Caen where its first job was checking 100 Evinrude outboard motors. As there was no navigable waterway nearby in which to test the motors, a special canal was built with steel plates and the job was done in three days. The unit was moved next to Abbeville, a trip of 100 miles, and then a further 100 miles to Ypres where their first job was to assemble twelve narrow gauge diesel locomotives. While in Ypres they helped prepare the Church of St George for and participated in the first post-liberation service. (Dedicated to the allied units occupying the sector in 1914-18, this church had been closed during the German occupation.)

The workshop moved next to Lier whereit suffered from V-1 and V-2 attacks and the alarm of the Ardennes offensive. A V-2 demolished the site six hours after the unit moved to Tilburg. At noon on 1 February the workshop was again hit by another V-2. Fortunately, nobody was severely injured. The next move was to Nijmegen where there was a heavy workload building pontoon bridges for the Rhine crossing.

In ten months 1 Canadian Engineer Equipment Workshop occupied nine sites, including four in the open and two under canvas. The workshop register included repairs to 1,000 outboard motors, 500 pieces of engineering equipment as well as 500 vehicles and motorcycles. It was a busy record for the two-dozen Craftsmen who manned this shop.[48]

1 Canadian Servicing Unit was formed on 15 November 1943 to do inspections and assist with unit maintenance and first-line repairs to many of the 450 - 650 Army Troops units which had neither LADs nor attached RCEME personnel. The unit was originally organized into six fully-equipped mobile sections that called on the units being served. This evolved into a system in which each section was assigned a number of units to serve. On the formation of the L of C units two more sections were added. The sections moved with their assigned units. The success of the unit can be measured in the volume of work; 13,000 inspections or repairs.

1st Radar Battery was formed shortly after D-Day in France to be employed in the counter-mortar role. DDME Branch CMHQ was asked at that time if a battery employing ten AA No. 3 Mk 2 radar sets could be serviced by RCEME. The answer was affirmative and 1st Radar Battery Workshop was formed.

49. History of 4 Armd Tps Wksp, op.cit., pages 27 and 45.

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The men trained at COMERU and the workshop vehicles were outfitted at 1CBW.[48,50]

The workshop landed in France on 14 November 1944 and by early December was deployed with its battery in the Nijmegen area. Six radar sets were deployed along the Maas from 10 miles southeast of Nijmegen to 12 miles west of S'Hertogenbosch. The battery comprised a headquarters and two troops, each having three radar detachments. Each detachment had an Accurate Position Finder, a Zone Position Indicator and a diesel generator. The workshop organization was similar. It had a commanding officer at battery headquarters and a section for each troop. Each section had a headquarters, a second-line repair detachment at troop headquarters and a first-line repair detachment with each radar detachment. Each detachment had a staff-sergeant radar artificer and was designed to operate independently and move with the radar detachment that it supported.

On 2 December one of the combined radar/workshop detachments was sent forward onto Nijmegen Island to a pre-assigned location. The detachment unwittingly passed through British lines and shortly after spotted a German reconnaissance vehicle, which quickly withdrew. The detachment immediately advanced for half-mile beyond the next crossroads and was setting up in a farmyard as the crossroads was shelled. The detachment was in action by nightfall when the radar troop leader and Lieutenant G.L. Marrotte, the workshop section commander, joined them. The next day it was withdrawn from this advanced position in front of FDLs for fear of being flooded by the Germans![50]

In late February the radar sets were given an extensive overhaul and major tune up in situ. This was done by taking each set out of action in turn for 24-hours and moving the second-line workshop vans forward. Consequently, all was ready for the Rhine crossings and fast deployment into northern Holland where there were often daily moves and little time for maintenance. This organization of RCEME - siting with the operating sets - worked extremely well, with much valuable work being done to deploy and maintain large vulnerable sets so near the front line, particularly near the many canal and river crossings. This same close relationship is repeated today with Low Level Air Defence Batteries and their EME workshops.

4 Heavy Recovery Section of 2 Recovery Company landed in France on 2 August 1944. The section included 67 men, 8 heavy recovery vehicles, 5 tank transporters, 3 7½-ton trailers, one D-8 tracked tractor and one universal carrier. During this period, most of the recovery vehicles were out on point duty in and around the Caen-Falaise area. The transporters were very active on recovery and the section was much split up. Recovery work at this time was heavy. A sad part of the job was cleaning the dead from knocked out and damaged vehicles.[51]

Bad weather and rain set in for three or four days after the move to Belgium in September, making the movement of heavy vehicles very difficult. In fact the recovery vehicles were fitted with mud tracks on their rear wheels. During this time a number of the transporters were working with the RCASC on special priority work. The transport work continued and in February 1945 four transporters were sent on a special job and carried their loads to within 500-1000 yards of the front line. On their return they were heavily-mortared and hit by shrapnel in many places. Craftsman C. Syntak was killed. He was the unit's second fatality.

Heavy recovery equipment was often required in the soggy fields of northern Germany. In late April, Corporal Younce and his crew of two with a tank transporter and the D-8 gave assistance to recover four vehicles needed for immediate action. Two SP guns and two Kangaroos had been holed by panzerfaust fire and were bogged down but still runable. An enemy patrol had broken through in this area. Its commander had ordered all civilians out of the nearby houses and then burned them. Two tanks and one infantry platoon were detailed to give covering fire to the recovery crew. While enemy sniping and shellfire continued all four vehicles were pulled out and running in three-and-a-half hours.[51]

88 LAD in support of the Elgin Regiment, the armoured delivery regiment, landed in France on 12 July 1944.[52] A week later, during the crossing of the Orne, the LAD was located just north of Caen with its delivery regiment, ready to prepare and issue repaired or new tanks for battle. The unit scribe noted that it was "our biggest job. The front needed tanks and more tanks. We gave them tanks and also built up a surplus. Nearly every hour of every day was hard slugging but the tanks were going through. During this

50. Marrotte, LCol G.L.; taped report, 1976.
51. RCEME Unit Histories, op.cit., Chap IV.
52. The Elgin Regiment had two LADs, 23 & 88.

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rush there was an epidemic of diarrhoea, a near plague of ear-wigs and much night bombing and strafing. All of these cooperated on letting none get a good night's sleep. During the day the air was filled with choking sand thrashed up by the tanks."[51]

123 LAD or, as it is more commonly known, the Kangaroo LAD was formed on an ad-hoc basis in the field in August 1944. It was formed to support 36 Kangaroos for a period of up to two weeks. Its 31 all ranks had been obtained from 32, 33 and 34 LADs and it was under command of Captain W.T.E. Duncan of 33 LAD. The equipment and a stock of spare parts were obtained from the same sources. The LAD gathered at Bayeux on 5 August and moved up to the area of the Royal Regiment of Canada outside Caen where the 36 Kangaroos were harboured prior to going into action with the regiment on the opening night of the attack. There was a considerable number of light repairs required just before action especially after several trial lifts with the infantry.[48,53]

The attack went in during the first night and for the next four days the LAD had a great deal of work gathering up the numerous Kangaroos which had fallen by the wayside through break-down or enemy action. Very little time out of operations was given during this and the later stages of the breakthrough, so the LAD was kept very busy. Then to add to the load, another 36 Kangaroos which had been loaned to 51st (British) Highland Division on another sector were returned. This doubled the number of carriers to be supported by the unit. On two occasions during this operation help was given by nearby second-line workshops to carry out rapid repairs, some of a heavy nature.

On 24 October 1944, 1st Canadian Armoured Carrier Regiment came into being with the resultant increase in the LAD's establishment to 52.

Early in January, two troops of "B" Squadron were in action for two days at Wanssum Wood on the Maas River and a section of the LAD accompanied them. Eight carriers ran onto a mine field. Recovery operations were very difficult as this sector was under direct enemy observation. Operations, therefore, had to be carried out at night with much care and a great deal of difficulty owing to the cold, snow and intermittent mortaring. However in two days seven out of the eight APCs were recovered, repaired and sent back to Tilburg.

Then on the night of 8 February, there began 29 days of steady fighting through some of the worst tank country imaginable due to the incessant flooding and mud. Here again the recovery crews and fitters were working all hours of the day and night keeping the carriers working through the continually tough going caused by boggy terrain. Again there were about 60 Kangaroos pulled out of the mud or repaired after being hit by anti-tank or panzerfaust, i.e. bazooka, fire.[53]

Of the units under command 1st Canadian Army Troops during this campaign, two workshops and four LADs were REME units. 824 Armoured Troops Workshop was under command from 20 August 1944 until the end of the war. 231 Infantry Brigade Workshop functioned as a "B" vehicle servicing unit in support of the First Canadian Army Vehicle Park from December 1944 until the end of the war. One of the LADs supported 13 Air Formation Signals and the other three LADs supported Royal Engineer Airfield Constructions Groups. These units proved a valuable addition to Army Troops and it was with mutual sadness that they left command.[48]

Close wartime working relationships such as these form the basis for today's continued close affiliation between the Corps of REME and the EME Branch.

Along the Lines of Communications

Stretching far back from the front line armies to the ports on the English Channel were the L of C troops of 21st Army Group. These troops included many Canadian units, such as: a mobile tire unit, nine LADs supporting reinforcement units, two port workshops inspecting and repairing equipment passing through ports, an LAD with the Canadian L of C Signals and two L of C telecommunication workshops formed at the end of the war to clean up the huge backlog of equipment.

The two advanced base workshops were the two largest L of C units. Each of these 500-man shops had about 300 tons (or 36,000 cubic feet) of equipment but neither had its own transport on establishment. Nevertheless, 2 Advanced Base Workshop moved 300 miles from Normandy to Antwerp during September 1944 by borrowing twenty 3-ton trucks, twenty 6-ton trucks and two 40-ton transporters. This move took

53. Hodgson, op.cit., page 577.

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only two weeks from close-down to reopening for full scale production.

1 Advanced Base Workshop landed in Normandy on 30 July 1944. By 2300 hours the unit had cleared the beach and arrived at its location near Bayeaux 3½ hours later. This site was in front of the Canadian heavy guns. Preparations for Operation Totalize were in progress and the workshop was soon busy inspecting and repairing 400 guns over the next two days. This was followed by a crash modification program in which 400 field artillery tractors were modified to carry 17-pounder anti-tank gun ammunition. The average weekly overhaul rate throughout the campaign was 140 vehicles, mostly carriers or armoured cars. Just prior to the Scheldt operation the workshop installed all of the wireless sets used in the Buffaloes (amphibious troop/cargo carrying vehicles).

2 Advanced Base Workshop landed on 13 August and was located in a cow pasture near La Déliverance, two miles inland. Because of the soft standing it was impossible to set up the shop on the site. However, the stop was only to be temporary. The final stages of closing the Falaise gap were in progress and the unit was to move forward to follow the pursuing armies. Therefore, no attempt was made to unpack or build permanent roads, buildings etc. in the workshop area. During their six-week stay in Normandy, members of the unit were used to clean up the residue in Drowned Vehicle Parks, Backloading Parks and "crock" parks which had been set up as part of the beach clean-up program. 1,600 trucks were put back on the road as well as several tanks. Instruments, small arms and guns were rebuilt to the limited extent possible.

The workshops moved in November 1944, with 1 Advanced Base off to Brussels and 2 Advanced Base to Antwerp. They remained in these locations until the end of the war. While in these locations both workshops were subjected to V1 and V2 bombing, suffered extensive damage, loss of production and injuries. In February 1945 nearly 60 of these "buzz bombs" landed in the area of 2 Advanced Base Workshop. "One bomb" recalled Major Bert Hargraves, "fell just outside of the workshop, destroyed a stack of new tank engines and broke every pane of glass in the roof.[54]

Many vital field engineering jobs came their way. In December 2 Advanced Base Workshop adapted 100 40-ton transporters to bulk load carriers. This was done, without destroying the tank-carrying capability, at a time when the advance had extended beyond support of ports still based in France. Due to a shipping loss at sea in November 1944 there was a shortage of the circlets used in firing the 2-inch "Mattress" rockets. In five days, the Workshop manufactured 3,000 circlets, which were required for the rocket barrage in preparation for the Rhine crossing. For the same battle 1 Advanced Base Workshop overhauled 100 tanks for 33 British Armoured Brigade. Although in the L of C, the two advanced base workshops often had to react quickly to the direct urgencies of battle.

On the human side, Canada's Craftsmen demonstrated, throughout the campaign, their ingenuity in making life comfortable and in taking the opportunity for training, education and recreational activities.

Making Life Comfortable

"Any damn fool can be uncomfortable" was an attitude that permeated the Canadian Army during World War Two. The attainment of comfort, however, was a matter of degree dependant (at the top) on rank and materiel and (lower down) on a combination of opportunity and quantity.[53]

Caravans. Senior officers had much to say about the design of their personal caravans. However, the development agencies (usually RCEME) strove for the efficiencies inherent in standard design. For example, the 2nd Canadian Corps standard design lengthened the truck body to 17-feet 6-inches by moving the box forward and welding a five-foot section taken from a crock onto the back of the box. The superstructure was raised to 6-feet 9-inches. All steelwork was done by RCEME and wood panelling and cabinetry was done locally. Issue bed, English lights and German desks were provided as well as RCEME - designed light-proof ventilators.[55]

By the winter of 1944 the campaign had slowed down. Therefore authorized caravan construction was started at the divisional level. CREMEs either brought in an officer or appointed their EME Telecommunications officer as coordinator of caravan construction. These unhappy officers were usually referred to by their colleagues as the "DADME Caravans."[55]

The brigade workshops constructed caravans of various ingenious designs for themselves and the

54. Hargraves, Major Bert; speech notes, 12 April, 1986; page 6.
55. War Diary DDME 2 Cdn Corps.

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regiments they served. These caravans were constructed of light-gauge sheet metal - easier to find than plywood.

Shelters. The officers and men of the brigade workshops were generally accommodated by workshop sections. With the facilities and skills available it was not difficult for them to make up safari-type beds. Although the safari bed was popular because of its light weight (seven-and-a-half pounds) and portability (it rolled up and could be packed in the middle of a bed roll) it was once described as "a bed guaranteed to prevent one from sleeping in past 5 o'clock in the morning." Accommodations for the third and fourth-line workshops were often supplemented by billeting the men in civilian homes.

In the field, the LADs sheltered their men in groups based on their trade, employment or mode of travel - in one LAD the sergeant-major and the clerk slept on the desk and in the aisle of the office trailer. The recovery crews each had their own shelters and took them wherever they went. The remaining tradesmen arranged themselves into shelter groups identical to the vehicle groups they usually travelled in.

Kitchen Trucks. Little emphasis was placed on the design, development and issue of mobile, efficient field kitchens to the units. All that was provided was an unimaginative set of drawings for the conversion of 3-ton GS trucks to kitchen trucks "within units' resources."

Preparing three appetizing meals a day for a company or a squadron in the field in the limited confines of the back of a truck, was a challenge. The value of meals to morale warranted that every consideration should be given to the cooks' preference in lighting, equipment and layout of storage and working areas. Thus, many kitchen trucks of excellent design were created. The more ambitious cooks had bake and warming ovens - one had a marble slab countersunk into the work bench to roll pastry.[56]

Heaters. Various types of heaters were field-designed to replace or supplement the limited supply of smoky kerosene-burning space heaters. The field-designed heaters were of the fuel-water drip type. Fuel varied from crankcase oil to mixtures of oil and gasoline and even pure gasoline. The fuel was dripped on a preheated plate that vaporized and burned the fuel in such a manner as to keep the plate hot enough to maintain the cycle. The water, controlled separately, dropped on the same plate and flashed into steam, improving the combustion. These prototype drip-type stoves were later used as a basis to develop stoves for the bunkers in Korea.

Cookers. The standard issue cooker was an oversized gasoline blowtorch that weighed 60 pounds. The food was partially cooked, then placed in insulated containers where retained heat completed the cooking process without further use of the cooker. These cookers operated by passing fuel through a heated ring-shaped pipe where it was vaporized. After a few hourd use, however, the ring often became blocked up by deposits from the fuel. The easiest way to clean the ring was to cut it off, heat it to a dull red and force pure oxygen through the ring to oxidize the deposits. The rings lasted about three such cleaning treatments.

A much better cooker was introduced by Major W.M. Dalrymple from the Italian Theatre. In his cooker the pressurized fuel tank of the standard cooker was connected to a long bent tube fitted with three of four burners. Fuel oil was used and the plumbing had clean-out provisions for ease of maintenance. Resembling a trombone, it became known as the trombone cooker and was used in the kitchens by almost every RCEME workshop. 3 Infantry Troops Workshop even made a shower bath heated by a trombone. It took only three-quarters of an hour to heat 120 gallons of water.

Newspapers. The talents of some craftsmen included writing. Hence a number of units published newspapers and produced campaign-end souvenir magazines. The titles of some of the newspapers included: *The Coverall* of 1 Army Troops Workshop, The *Stoker* of 2 Infantry Troops Workshop, *Our Assembly Line* of 3 Infantry Troops Workshop, and the *Howler* of 2 Tank Troops Workshop. These publications gave an interesting picture of daily life in the workshops, including work, training, visits, and trips.

The *Howler* of 15 December 1944 summarized the unit's production record during its first six months service on the continent. The unit had repaired 700 tanks or trucks, 200 guns, 360 radios, and rebuilt 50 major assemblies. The unit was particularly proud of the "rapid movement forward during the pursuit from Falaise to the Belgian border, when we covered in ten days' time over 250 miles in convoy, set up shop three times, repaired and completed fourteen AFV's and seventeen "B" vehicles."[57]

On a different note the 2 October edition of the *Howler* described the Memorial Service at Ypres;

56. Hodgson, op.cit., page 577.
57. *The Tank Troops Howler*; Unit paper of 2 Tk Tps Wksp, 1944-45.

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"The darkness that has shrouded the portals of St George's English Church in Ypres ever since the Germans invaded the country in May, 1940 was officially lifted yesterday with the holding of the first Sunday service since the day the enemy closed its doors. ...The members of this workshop should feel a keen sense of pride in that they played a prominent part in this historic occasion."

The first edition of *The Coverall* leads off with the article, "It's yours now." Calling for a "snappy name for the rag," the "Coverall" was named by the second edition. The paper produced 41 editions and a final souvenir edition by 17 June 1945. The editor, Corporal M.V. Putnam, was successful in his objective of providing a glimpse of "Unit life" with columns and articles having names such as: Sparks for the Anvil, Jottings from Recovery Lane, the Underground, Joe's Fitting Station, etc.[58]

"Mac Key," a frequent contributor, in commenting on the activities of the Armourer section in February 1945, noted that the section had been "doing a splendid job" at the front. Weapons swept up from the battlefield were repaired "in the field" and then sent to Ordnance for re-issue. None had been returned for further repairs. "While in Normandy the section checked 1200 weapons under trying conditions."[58] Even in their newspapers the Craftsman's thoughts were never far from their work.

Christmas 1944. RCEME units celebrated Christmas 1944 in the time-honoured way, but under varying circumstances. On 4 December, 8th Infantry Brigade Workshop held a gala Santa Claus party for the children of Veghel, Holland. The party was a huge success. The children received gifts and candy and in return presented the unit with an 8-week old puppy.[40]

By Christmas, 4 Heavy Recovery Section was located near Grave, Holland. Things were getting pretty hot at this time owing to the German offensive through the Ardennes. Enemy paratroops were reported landing in the Canadian sector and extra guards were put on. Vehicles were to be destroyed in case of a breakthrough. In the midst of this tense atmosphere the Christmas party went off with a bang, with the officers and senior NCOs serving dinner to the men. There was a day's rest for everyone and an ample free issue of chocolate bars, peanuts, beer, cigarettes and cigars. On 29 December orders were received to CB the whole camp and issue extra ammunition, and no one was to undress at night.

Some of the men were sent to guard a maintenance company and all the camp was warned of possible enemy action.[59]

Other Amenities. As the war wound down in the early spring of 1945 some craftsmen were able to get a few days leave in the UK or in leave centres set up in France and Belgium. This was done on a pro rata basis. Several of the larger workshops had Legion War Services Supervisors who did an excellent job of supplying entertainment and comforts for the unit and maintaining canteens.[48]

Rehabilitation programs were developed for the soldiers overseas. However, the program of rehabilitation training as outlined by Army instructions was not wholly applicable to 1 Army Troops Workshop due to the heavy commitments in the vehicle shop that continued on even after VE-Day. It was therefore impossible to conduct a full program as in infantry units. However, a modified program was initiated soon after the unit settled in Arnhem, Holland. All lectures were compulsory and in the first phase they included such subjects as money, benefits and in-service opportunities.

A course soon followed, based on Canadian Legion Educational Texts and special courses set up by the Canadian Army Educational Section. It covered such subjects as mathematics, English, mechanical drawing and electricity. Both elementary and advanced courses were made available to all ranks. The program was designed to make good use of the time interval between VE-Day and repatriation and to aid the soldier in civilian life.[60] Craftsman A.A. Stodalka, for example, was able to complete his High School graduation under these programs. On his return to Canada he entered university, graduating as an engineer.

After the war was over some of the troops became part of the Occupation Force. There was the regular work routine of inspection and repair of equipment being prepared for handover or sale. There were rehabilitation and leave programs. There were also some unusual and inventive projects. For example, 1 Infantry Troops Workshop had its own swimming pool built. This 25-metre pool, which had been excavated using the Unit's dozer and an excavator borrowed from the engineers, had a 6-metre diving tower. The pool provided many pleasant afternoons for the craftsmen and even some of their girl friends. It again

58. *The Coverall*; Unit paper of No 1 Army Tps Wksp, 1944-45; issues 1/1 and 2/8.
59. RCEME Unit Histories, op.cit., Chap IV.
60. The Coverall, op.cit., Final Edition.

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demonstrated that Canada's Craftsmen were adept at making life comfortable.

Production - A Proud Record

In just eleven months, D-Day to VE-Day, the Canadian Army compiled a magnificent record during the Northwest Europe campaign. From the beaches at Courseulles-sur-Mer in Normandy to the North Sea coast of Germany and Holland they advanced over five hundred miles and were almost continuously in action. On D-Day, one Canadian division landed as part of a British corps. By VE-Day, there were five Canadian divisions united to form a two-corps Canadian army. 14,500 Canadians went ashore in Normandy on 6 June 1944. By campaign's end eleven months later, 1st Canadian Army had an establishment of 170,000. 335 were killed on the first day. Fatal casualties totalled 12,500 by the end of the campaign.[61,62]

There was a massive amount of equipment and firepower for this army which, over a period of 333 days, encountered 60 different German divisions - usually the best. Supply and maintenance of equipment were essential to assure the firepower so vital for success.

The front-line punch of this army comprised approximately 2,000 tanks, carriers or armoured cars; 2,000 guns, rockets and heavy mortars; 5,000 trucks; and 15,000 small arms and machine guns used by front-line infantry soldiers. The back-up for this punch was prodigious in order to provide buildup for attacks and replenishment during advance, as well as continual repair, replacement or recovery during battle, on the move or in the lull before a new operation. Hard use, battle casualties and rapid turn-over all exacerbated the overall problem of sheer staggering numbers.

The repair load for 1st Canadian Army fell on the 7,000 working tradesmen of the RCEME units and the 3,000 unit tradesmen of the combat units.[63] Yet these 10,000 Canadian Craftsmen compiled an impressive record of repairs during this arduous campaign of fierce battle and rapid advance over hedgerows, rolling plains and canals under the searing sun of summer or the numbing slush of winter. They recovered trucks along clogged muddy roads or tanks from mine fields. Before and during battle or in the midst of supply convoys, they serviced and adjusted equipment anywhere, anytime. They repaired tanks under fire or set up production lines in devastated factories. Their record for the eleven months from D-Day to VE-Day included 14,000 AFV repairs, 6,500 gun repairs, 128,000 small arms and machine gun repairs, 56,000 truck repairs, 61,000 instrument repairs and 28,000 radio repairs.

It was production - a proud record.

61. Stacey, Col C.P.; *The Canadian Army 1939-45*; Queen's Printer, Ottawa, 1948; pages 179 and 272.
62. Stacey, Col C.P.; *The Victory Campaign*; Queen's Printer, Ottawa, 1960; page 641.
63. Grant, Brig A.M.; notes for a speech at the RCEME School, 1949.

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Chapter 6 - SUPPORTING THE WAR FROM HOME

Many people assumed during the years before 1939 that, in the event of another war, Canada would be in greater direct danger than in 1914-18. Nevertheless, no real menace to Canadian soil developed at any time during the war. There was no invasion, there were no landings from the sea or bombings by aircraft, nor is there any evidence that the Germans or Japanese ever seriously considered such enterprises.[1] *Consequently, after getting organized on a war footing the main effort of Canada's Craftsmen on the home front was equipping the army and training craftsmen while, at the same time, supporting the Army at home.*

Organizing for War

As World War Two started, repair and design organizations had to be expanded to keep pace with mobilization (see page 26). Then in late 1940, as a result of the equipment losses at Dunkirk, expansion and reorganization were again the order of the day as Canada became a major arsenal for the Allies.

In 1941 the office of the Chief Ordnance Mechanical Engineer became the Directorate of Mechanical Maintenance (DMM). By 1943 the staff of DMM numbered 150 and the director was Colonel G.M. Grant. In 1944, on the formation of RCEME, DMM became Directorate of Mechanical Engineering (DME). In his opening remarks at the first RCEME conference on 22 June 1944, Colonel R.L. Franklin, the first DME, noted that DME was one of several directorates in the MGO Branch. "The Directorate's main function," he said, "is to give technical direction to all RCEME units in Canada and to determine the policy and procedures that will ensure within the Canadian Army in Canada the efficient maintenance and repair of all electrical and mechanical equipment by both unit and RCEME Workshops."[2]

RCEME at this time was a new corps with a Corps Headquarters and, as Colonel Franklin noted, "is the organization set up and directed by the Officer Administering the Corps (OA Corps). The Corps HQ is constituted by what is called the Personnel Administration group of DME. The OA Corps covers a dual role including the appointment of DME." He further noted that the Corps HQ, headed by the OA Corps, was a permanent organization which would be retained, as long as there was a Corps of RCEME, to administer the Corps as a whole. (The OA Corps can be looked on as the forerunner of the EME Branch Adviser.)

DME had two divisions, Administrative and Technical. The former comprised several Groups; Personnel Administration, Publications, Establishments and Administrative Procedures and Directorate Administration. The Technical Division had four groups. Three of them, Armament, Vehicle, and Telecommunication, set policy and directed maintenance for a class of equipment. The fourth, General Maintenance, was responsible for ancillary trades, workshop layouts, time studies and workshop loading plus purely (maintenance) engineering projects such as rubber and lubrication.

From the early days of the war the Master General of the Ordnance (MGO) Branch of the Department of National Defence had built up design staffs in the fields of automotive equipment and signals. These staffs were recruited from industry and from the permanent army and comprised experts with long industrial experience in their particular fields.[3]

The MGO Branch, which included the Directorate of Mechanization and Artillery (DMA), was responsible for acquisition as well as the development of equipment. In April 1940 the purchasing function was transferred from DND to the Department of Munitions and Supply (DM and S). The procurement and development functions remained with DMA which by August 1940 had become too large and was split into several new directorates each of which was responsible for design and provisioning for a range of equipment.

1. Stacey, Col C.P.; *Six Years of War*; Queen's Printer, Ottawa, 1957; page 145.
2. *RCEME Conferences 1944-1955*; minutes 1944-1955; 1944, page 11.
3. Kennedy, J. de N.; *History of the Department of Munitions and Supply*; 2 Volumes, Kings Printer, Ottawa, 1950; Vol 1, page 52.

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The actual purchasing, of course, was done by DM and S. (This is reminiscent of the arrangements today between the procurement directorates of DND and the Department of Supply and Services.) These new directorates included: Directorate of Ordnance Services - Mechanical (DOS(M)) for vehicles and tools; Directorate of Ordnance Services - Technical Stores (DOS(TS)) for weapons and technical equipment such as radios and radar; and Directorate of Ordnance Services -General Stores.[4,5]

Canada fast developed into a major producer of weapons and vehicles. Consequently, the design and procurement staffs grew and in July 1941 there was another major reorganization. In DM and S the Army Engineering Design Branch (AEDB) was established to ensure close coordination between army engineering design on the one hand and industrial production on the other.[6] Many of the design experts of DOS(M) and DOS(TS) were transferred to AEDB and formed its nucleus.

In the MGO Branch of DND the former design and provision directorates became procurement directorates only and DOS(M) was renamed Directorate of Mechanization (D Mech). The director for most of the war was Colonel E.D. James.

Several new directorates were also formed in the MGO branch to look after user requirements such as kitting and other development work not transferred to AEDB. These included the Directorate of Development of Vehicles and Small Arms, the Directorate of Electrical and Communication Design and the Directorate of Inter-service Research and Development (Clothing and Equipment). These three directorates plus the weapons section of the Directorate of Artillery can be looked on as the forerunners of former DGLEM directorates. It is also significant to note that, within the MGO branch, these directorates were grouped in one sub-branch while D Mech, DMM and DOS(TS) - all directorates dealing with procurement and maintenance of army equipment - were grouped in another sub-branch and the stores directorates in a third.[6]

By 1941, purchasing and production control as well as design and service engineering was done by the Department of Munitions and Supply. The department was operated by two coordinators, one for production and one for control, who reported through a deputy minister to the minister, The Honourable C.D. Howe. On the production side there were, in addition to the AEDB, nine commodity production branches including Vehicles, Tanks, Signal, Guns and Small Arms. Colonel N.O. Carr, the former DMA, who later became the first DOS(M), was promoted to Brigadier and transferred to DM and S, where he became Director General of the Automotive Production Branch. These branches were responsible for the production of war supplies under their jurisdiction and for developing capacity and capability as required.[4] In addition, in order to complement the capabilities and capacity of industry, there were also eleven Crown companies operating factories such as Small Arms Limited, to which Colonel M.P. Jolley was seconded as President.[7]

Equipping the Army

In equipping the army, Canada's Craftsmen participated as senior managers, engineers and technicians in such diverse activities as: design of CMP vehicles, production of tanks, writing and editing maintenance publications (EMERs and CAM), testing equipment (Vehicle Proving Establishment), developing maintenance and operating procedures for equipment under arctic conditions (Exercise Eskimo) and installing and maintaining radars in Australia.

Design of CMP Vehicles. Prior to World War Two a few prototype military ¾-ton capacity military trucks had been made and tested at Petawawa in the summers of 1937-39 (see page 11). However, none had been developed to production. Consequently, at the outbreak of war, no true military truck design was available that had been adapted to or developed for Canadian production facilities. Therefore, since Canada was to fight as a partner of the UK it was first decided to use British-type vehicles as it would be quicker and more economical to buy trucks in the UK for the Army Overseas. Dunkirk changed all that, however, and Canada had to design and produce trucks for the total Allied war effort.[8]

To design and produce trucks on a scale of nearly 200,000 per year, a strong centralized agency was

4. Kennedy, op.cit., page 12.
5. James, Col E.D.; *Functions of the Directorate of Mechanization*; paper, 1945; pages 1-3.
6. Kennedy, op.cit., page 52.
7. Kennedy, op.cit., pages 74, 101, 452.
8. LORE Technical Bulletin 2/82, page 65.

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needed. Hence, the Automotive Design and Co-ordination Directorate was set up in the Automotive Production Branch. Colonel Franklin was the Assistant Director from 1942-1944.[8] The directorate was set up when, as noted earlier, the design and service engineering functions of DND were transferred to DM and S. Thus the functions of design and production were melded into one strong team. And it paid off. Design to production normally took three years, but for the CMP vehicles it only took six months.

The need for a strong team was also required for development of vehicles for special conditions such as air transportability and wading and to correct deficiencies such as drivers' complaints about the original CMP cab.

The original CMP vehicle cab was based on the pre-war British army vehicle cab. When the first CMP vehicles arrived in England for the Canadian Army in the spring of 1940, it soon became obvious that changes in design were necessary to overcome strong complaints. Internal cab temperatures were too high. There was insufficient foot room for the driver to easily operate the foot controls. This was also a cab-over-engine type of cab and Canadians were not as familiar with it as with the conventional control type of chassis and cab that were the standard in Canada at that time. The first major modification put into production was an increase in cab air circulation to reduce air temperature, which increased the comfort of the driver and thus enhanced his safety and driving ability.

In order to provide more room for the driver, the cab was completely redesigned, enlarged and put into production by 1941. A major feature of the new CMP cab, and one of its trademarks, was a forward-sloping windshield that greatly reduced the ability to spot CMP vehicles by sun reflection.[8]

Air transportability for vehicles became a requirement as the scope of the campaign in the Far East increased and it became necessary to transfer vehicles for operational support to remote areas. In July 1944 the CMP vehicle designers were asked to make the design changes necessary to enable 3-ton CMP trucks to be air transportable in C47 Dakota aircraft equipped with wide-opening type cargo loading doors.[8,9]

After several trials, the changes selected were to remove the cargo body, most of the cab, the front and rear axles and one side of the rear of the chassis frame. Castor wheels were clamped to the chassis near each corner of the chassis frame to permit movement when loading and unloading. One unique feature of the modification was the installation of self-sealing hydraulic couplings in the flexible lines of the hydraulic brake system at the front and rear axles. These couplings permitted the disconnection and reconnection of the hydraulic lines without the necessity of bleeding the hydraulic brake system. (Today, two 2½-ton MLVW trucks can be driven on and loaded into a C130 Hercules aircraft.)

Wading of all-wheel drive vehicles with single tires in five feet of sea water with an 18-inch wave for six minutes became a requirement in order to make such vehicles suitable as spearhead vehicles for establishing beachheads from landing craft. In the early development stages it became obvious that the fuel induction system, high tension electrical circuits and hydraulic brake systems had to be made watertight for wading in water approximately three feet or more in depth. In particular, attention had to be paid to the design of components which could corrode when exposed to sea water. The resulting designs were the ultimate in wade-proofed components and, although too late for the war, the design work was subsequently applied to the SMP vehicles we use today.[8,9]

Tank Production. In the summer of 1940 it was decided to produce a medium cruiser tank in Canada. Montréal Locomotive Works was chosen to be the manufacturer. Based on the USA M3 General Lee medium tank the Canadian designed and built the Ram tank offered a lower silhouette and a full traversing turret. 1,949 Ram tanks were produced from 1941-43. In late 1943, 188 Grizzly M4A tanks were produced with cast hulls. By this time USA tank production capacity had increased so Canadian tank production was switched to 25-pounder Sexton Self-Propelled Guns based on the RAM chassis. 2,150 Sextons were produced from 1943-45 and it became the standard for British and Canadian forces. While the RAM tank did not go into battle as a tank, many reached battle as APCs, observation tanks, ARVs, flamethrowers or Sextons.[10]

Initially, communication between Montréal Locomotive Works and government departments was slow because there was no direct link between tradesmen on the shop floor and the design authorities (engineers and technicians) in government departments. The official link from company to department was

9. *The Design Record - Canadian Military Vehicles World War Two*; DND, 1945; Vol IV, pages 35-41.
10. Kennedy, op.cit., page 98.

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through president to minister. By 1943 Montréal Locomotive Works was starting to overhaul the first of 300 Ram tanks that had been used in training in Camp Borden. The communication problem now came to a head because this was the first time that an overhaul program had been attempted and there were many technical problems. Consequently, Captain R.E. Daly was loaned to the company from DMM. As he was to later recall, he became an "army liaison officer" but he was also authorized to make decisions on technical matters and to deal directly with design authorities.[11]

Previous overhaul practise for tanks, Captain Daly noted, had been to deal with each tank individually as required. The novel aspect of this program was that it was done on a production line basis, with each tank disassembled and its components inspected and repaired as necessary. Components were then reassembled to make a new tank in much the same way as overhaul programs are done to-day at 202 Workshop Depot.[12]

Maintenance Publications. The Electrical and Mechanical Engineering Regulation (EMER) system was started in 1943 by authority of Routine Order 4372 to provide all administrative and technical data required by RCEME. The Publications Section of DME was responsible for the publication and distribution of both EMERs, which had a worldwide application, and Canadian Army Local Electrical and Mechanical Engineering Instructions (CALEMEIs), which had only designated theatre or region application. Together, the two were often referred to as the EMERs.[13]

By 1944 EMERs had been produced for a fair number of Telecommunications and Armaments. However, there were only three Workshops EMERs and no Vehicles or Administration. The EMER system was designed to replace the multitude of manuals and texts that were in use in a variety of sizes, formats and for which there was no system of control. The task of transposing all this material to EMERs was recognized as an enormous but vital task.

The EMER series was broken down into a number of divisions - General, Workshops, Vehicles Wheeled, etc - and each division had a series of lettered sections, each covering a topic or range of equipment. Each section had up to 1,000 regulations individually identified by a 3-figure number, with the numbers grouped into blocks covering specific subjects or equipments.[14]

By the 1970's, when it was replaced by the CFTO system, the EMER system had become an institution and thousands of craftsmen had become familiar with and trusted its comprehensive coverage.

In October 1943 the Publication Section of DME started producing and publishing a special magazine for Canada's Craftsmen called CAM (Canadian Army Maintenance). In the first issue's editorial Major-General J.V. Young, the Master-General of the Ordnance, noted that the purpose of CAM was to assist the Canadian Army Preventive Maintenance program by getting "items of technical interest and instruction, in such a form that they may be easily read and digested," directly to tradesmen and equipment users in workshops and units.[15]

This goal was achieved by a bright and breezy mix of "how to" and "did you know" articles and cartoons penned in an eye-catching manner. "How's your Harley, Charlie?" for example, gave a hands-on, detailed, point-by-point listing of modifications and how to do them. Another article titled, "Tire Holding Lug," noted that, "Creeping tires kibosh inner tubes ...If you don't like hard-to-fix punctures, get to know Modification Bulletin C-1."[16]

One regular feature, "Sgt O'Sweat's Headache and Aspirin Department," became a favourite. The "Sarge," as the magazine referred to him (real life Sergeants J.D. Snell and L. Cunningham), answered technical questions from readers on all types of subjects, usually a half-dozen per month. Another tradition was editor Captain L.M. Norris's comic strip, the "CAM Pains of Benny Boob." With a few words, often in the form of a bit of doggerel, Benny reminded readers each month of some safety or preventive maintenance point.[17]

By the end of the war, as Captain Norris noted in May 1945, CAM was the recognized and accepted

11. Daly, Capt R.E.; taped interview with the author, 1978; location 271.
12. Daly, op.cit., location 342.
13. *RCEME Conferences 1944-1955*; minutes 1944-1955; 1944, page 88.
14. *CAM*; published by DMM and DME, 1944-45; 2/7, page 136.
15. *CAM*, op.cit., 1/1, page 5.
16. *CAM*, op.cit., 2/1, p 21.
17. *CAM*, op.cit., 2/4, pages 78 and 79.

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army trade journal. It enjoyed readership and interest in all units.[18] However, as he wrote in the editorial of the last issue in September 1945, "The job ahead for this army is no longer only the overhaul of guns or the maintenance of trucks. Now it's the building, of homes and maintenance of family cars ...CAM has finished its job." (Traditions carried on, however, and soon the corps had another magazine - the RCEME Quarterly - while Sgt O'Sweat appeared later in the RCEME Technical Bulletin.) In recognition of his efforts in producing CAM Captain Norris was appointed a Member of the Order of the British Empire.[19]

Testing Equipment. At the beginning of the war there were no proving grounds in Canada and indoor testing facilities were strictly limited.[20] Consequently, at its 23 July 1941 meeting the War Establishment Committee recommended the formation of 1 Proving Ground Detachment RCOC(E). This was later approved effective that date. "Plans were immediately got under way with the idea of getting suitable grounds in the vicinity of Ottawa for laying out a proper Proving Ground based on the same lines as the existing Proving Grounds in the USA," noted the unit's diarist that summer.[21] By year's end the former Montréal Road site had been purchased and a staff of 18 under command of Lieutenant B.D. Irvin posted in. Development of the site continued throughout the war. By war's end, the Belgian blocks, alpine tracks, level concrete and figure-of-eight tracks and inclined slopes were in place very much as they were when LETE was closed in 1994.

Prior to the development of properly-controlled tests at the Proving Grounds, vehicle contractors had been disturbed at times by the tests applied by Army test drivers. Although war usage justified much of this early testing, certain extremes were subsequently shown to be more severe than necessary, resulting in redesigns which were unduly heavy and which caused delays and sacrificed performance. Much time was spent in designing tests that gave the correct emphasis and by war's end the tests being conducted by Lieutenant-Colonel Irvin's test teams were, in the main, agreed upon by contractors as being practical simulations of field conditions.[20]

Equipment Operation in the North

The first technical effort made by any government on any scale to determine the requirements of sub-zero operation was the series of trials carried out by the Army Engineering Design Branch at Kapuskasing, Ontario from January to March in 1942.[22] The results of these tests gave the first indications of the requirements involved in starting and operating equipment in Arctic conditions.

Work developed to the extent that during January and February 1945 the Army conducted Exercise Eskimo, a winter manoeuvre exercise, in north central Saskatchewan. The exercise involved 2,000 men organized as a skeleton brigade with L of C troops moving 360 miles over undeveloped bush-covered plain dotted by lakes and muskeg.[23,24] There were approximately 500 vehicles (including a Ram tank) and ten guns, including four 25-pounders plus small arms, radios and other equipment. To maintain this equipment Lieutenant-Colonel K.H. McKibbin, commanding the RCEME group, had an establishment of 190 all ranks organized into a base camp workshop at the Prince Albert Armouries, an L of C workshop for radio and small arms repair, two recovery posts and a brigade workshop of 81 all ranks working entirely in shelters. The workshop moved several times during the exercise.[23]

The Ram tank, noted Colonel McKibbin, caused absolutely no trouble and went the whole way under its own power. Another Canadian-designed vehicle, the Armoured Snowmobile, also performed very well. From RCEME's point of view, he also noted, there was a requirement for workshop shelters and a means of heating them. Two types of tented shelters and a special airport-type heater were tried. The machinery trucks worked well but the penthouse attachments were too draughty.

This exercise provided the first means of testing the maintenance and operation in the Arctic of a wide range of equipment under battle conditions. The results provided valuable assistance for equipment designers and users. The results also indicated that RCEME could carry out its role of repair and recovery under conditions of extreme dry cold. Because of Canada's geography and the Russians' silence at the time

18. *RCEME Conferences 1944-1955*; minutes 1944-1955; Conference 1945, page 97.
19. Capt Norris' citation.
20. Design Record, op.cit., Vol 1, pages 28-33.
21. War Diary of Proving Ground Detachment, July 1941.
22. Design Record, op.cit., Vol IV, page 31.
23. Minutes of RCEME Conferences 1944-1955; 1945, pages 14-28.
24. *Exercise Eskimo*; DND report, 1945; Vol 1, page XV.

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on the subject of winter warfare, it was critical that Canadians had as much information as possible on fighting in the Arctic. Canada had to be prepared for possible operations against Japan in Manchuria.

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Training Craftsmen

In early 1940 the Canadian Ordnance Training Centre was consolidated in Kingston.[25] By 1941, with the expansion and mechanization of the Canadian Army in full swing, it was realized that no-one in defence headquarters had really considered just how many mechanics might be needed or from where all the mechanics were to come. Accordingly, the DMM was ordered to take over some signals barracks near Kingston to start up a large mechanical training centre by whatever means necessary and with whatever equipment was available, anywhere.[26]

While a camp was being constructed for it at Barriefield, training was carried out at installations in Kingston. For example, the former riding stables at RMC served for OME training. On 15 February 1941 the training centre's designation was changed to A21 Canadian Ordnance Corps Training Centre. By 1943 the centre was consolidated at Barriefield where it had 160 buildings with a value of $3 million and equipment valued at $15 million. By 1944 the name had been changed to A21 Canadian Ordnance and Electrical and Mechanical Engineering Training Centre. Approximately 80% of the training was for RCEME personnel. The centre had a staff and student strength of 400 officers and 5,000 other ranks.[27]

Recruits came to the Centre from recruiting depots and were given a 10-week military training course. After the course, those selected for artisan trades went to S8 Canadian Army Trades School in Hamilton while those selected for automotive trades went to S9 Canadian Army Motor Mechanics School in London. After this course, tradesmen were then trade-tested at Barriefield and dispatched to units. Artificer training was conducted at Barriefield, as was the 31-week EME course for officers.[27]

After the war, in the fall of 1945 the Royal Canadian Ordnance Corps School was opened in Montréal at Longue Point Garrison, and Barriefield became the RCEME School.

Canadian Technical Training Corps (CTTC). On 4 June 1943 the formation of the Canadian Technical Training Corps (CTTC) was approved. The CTTC comprised boys of 17 to 18 years of age undergoing basic and trades training which could be completed by age 19, when they would then be eligible for service overseas. In 1943 it was estimated that the numbers in training at any one time would be 1,500. By February 1945, however, there were 2,300. But since the war was winding down, enlistment was halted.

If on enrolment a lad was under the age of 17½ he was given the rank title of "Boy." On attaining the age of 17½ he was given the rank of "Private" and a pay raise of 60¢ per day, thus elevating his wage to the princely sum of $1.30 per day! A typical training course comprised one month of general military training, three months of technical orientation training, six to ten months trades training and, finally, two months driving and maintenance training.[28]

Electrical, Mechanical, Automotive, Drafting and Survey courses were taught to the Boys at Hamilton, Rimouski, Saint John, Saskatoon, Victoria and other centres. Most final trade tests were given at S8 Canadian Army Trades School, Hamilton. Often this was followed by more advanced trade courses such as radio, instrument, or weapons repair. Successful completion was followed by a six-week course at S5 Canadian Drivers and Maintenance School, Woodstock, Ontario. After that the graduate was assigned to a new Corps as a fully-trained soldier. Usually, his first act was to throw his CTTC cap badge as far as possible so that he would not be identified as ever having had "Boy" status.[29]

Many CTTC graduates remained in the peacetime army to give long and dedicated service. One, Captain J.R. Hardy (who retired in the fall of 1981), was the last serving Regular Force RCEME/LORE member with continuous service that included World War Two.

Supporting the Army at Home

Support was required for the units and formations responsible for the defence of Canada. Support was also required for the nearly one-hundred units responsible for recruiting and training soldiers and dispatching them to the army overseas.

At the start of the war the Canadian Army was organized into a number of Military Districts which more-or-less followed provincial boundaries. Operational command of the forces defending Canada,

25. *RCOC Standing Orders*; 1965; page 17.
26. Malone, Richard S.; *A Portrait of War 1939-43*; Collins Publishers Toronto, 1983; page 65.
27. Minutes of RCEME Conferences 1944-1955; 1944, page 84.
28. *Notes on the Canadian Technical Training Corps*; unpublished, 1946?.
29. MacIntosh, LCol R.L. & Yost, BGen W.J.; *Boy Soldiers of the CTTC*; EME Journal, Aug 84.

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however, was not put under the District Commanders. Rather, two commands were set up for the defence of Canada; Pacific Command and Atlantic Command.

Pacific Command comprised 6th Division (Vancouver Island), 8th Division (Northern British Columbia), the Victoria-Esquimalt Fortress garrison and the Vancouver defences. Atlantic Command comprised 7th Division (centred on Debert, N.S.) plus eight battalions in fortress garrisons or in Newfoundland.[30]

These commands had operational control of forces earmarked for the defence of Canada in their areas.[30] Because of the relatively static role envisaged for the units of these commands, the Districts were responsible for their maintenance. In the case of 7th Division, however, maintenance was provided by integral service support units including 7th Divisional Ordnance Workshop.[26]

At the start of the war not all Districts had workshop sections in the PAM Ordnance Detachments. However, by June 1942, as the training establishment expanded each detachment was reorganized as an Ordnance Depot Company and had a number of stores and workshop sections, depending on the quantity and type of equipment and the number of camps being supported. In the summer of 1943 these were redesignated Ordnance Depots, with each having a Stores Company and a Technical Workshop Company. On 15 May 1944 the workshop companies were further redesignated RCEME Companies, each of which had command of a number of static or camp workshops. This was the organization that remained in effect until unification in 1968.

A perennial problem for the workshops in Canada was that they were used as a source of manpower for the Army Overseas and were consequently understaffed. For example, in late 1943 an unexpected shortage overseas forced a demand for 800 more motor mechanics than had been previously planned. After much discussion it was agreed that the workshops in Canada would provide 50 mechanics per month from their under-strength automotive sections. In another case a demand for 13 armament artificers (Wireless) could not be met because there were only 2 in Canada and both were medically unfit. "High grade" wireless mechanics were offered in lieu and accepted. However, there were only 23 wireless mechanics in Canada at the time that were medically fit![31]

As a result of these continual manpower shortages and the resulting competition for technicians, DME developed a method of assessing manpower requirements. This was the RCEME yardstick, which was based on the maintenance required per type of equipment. The first set of yardsticks were approved on 22 August 1944 and distributed by early 1945.[32]

There were many active Reserve units from which soldiers could be drawn for the Active Service Force. Tradesmen were needed to provide service for the equipment of these units. For this reason and to provide satisfactory recruits for the workshops overseas, 1(Res) Divisional Ordnance Workshop RCOC was formed in Toronto in the spring of 1942. A joint industry, civilian, Reserve and Regular effort, the unit was recruited to full strength in a very short time:[33] 344 all ranks went to camp that summer. By 1943 the unit was assisting the local district workshop at the summer camp. In June 1944 the Workshop took complete charge of second-line repairs on all Reserve Army vehicles for the whole six-week period of the summer camp. "This was done," the unit diarist noted, "without the necessity of assistance from the Area Active Force Workshop." That fall the unit was redesignated 2 (Res) Armoured Brigade Workshop RCEME. Their record of service continued during the summer of 1945.

The summer of 1945 also saw Colonel H.G. Thompson taking command. Colonel Thompson, who had commanded Toronto's Reserve workshop before the war, was the recently-retired DME and would soon become the RCEME Corps Association's first president. His dedication blended the reserve, regular and corps association elements of the Corps and set the tone for RCEME as the Corps entered the postwar years.

In his closing remarks to the RCEME Conference in May 1945, Colonel Thompson noted that the conference had been a success. "It is always a good thing," he said, "to have an exchange of ideas between the various Commands and Districts and NDHQ." He also noted that firm establishments, based on the numbers of equipment being supported, had been approved for the RCEME Companies.

In commenting on the proposal to form a RCEME Corps Association, he noted approvingly that

30. Stacey, op.cit., pages 163 and 175.
31. Minutes of RCEME Conferences 1944-1955; 1944, page 82.
32. Minutes of RCEME Conferences 1944-1955; 1945, pages 100-103.
33. *History of 1 (Reserve) Divisional Ordnance Workshop*; unpublished paper, 1946?; pages 1-5.

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there was a need for a means of contact between civilians and the military because in many instances they experienced the same problems.[34]

Radars for Australia

In 1943 the Australian Government acquired 86 Canadian-built anti-aircraft radar sets for use in Northern Australia, New Guinea and the South Pacific Islands. Australia also requested the loan of sufficient radar technical personnel to maintain this equipment[35] and to instruct at the Australian School of Electrical and Mechanical Engineering located in Camp Ingleburn, New South Wales. Major H.P. Cadario of DMM was one of two officers immediately sent to Australia to discuss disposition of the technicians upon arrival in Australia.[36] The Canadian Radar Detachment on loan to Australian Military Forces of 73 all ranks - including 32 RCEME - was assembled in June 1944 and crossed the Pacific in small groups on merchant ships and tankers to assemble in Camp Ingleburn in September.[37]

Most of the Detachment was retained by 218 Australian Advanced Base Workshop and worked on "Tropic-treating" the equipment for use in New Guinea and the Islands. Others were posted to operational radar units on the northern coasts of Australia. A few, including Sergeants G.A. Thomas, J.E. Lauret and C.P. Shaw, were sent to Batavia, Java where, after the war, they were attached to the British Liaison Section there during the native insurrection against the Netherlands. By early 1946 all had returned to Canada.[36]

The Pacific Force

When the war in Europe was won on May 8th, VE-Day, attention immediately turned to the Pacific. On 17 May 1945, Cabinet approved a divisional-sized force to be employed with the Allied forces in the Pacific. Known as the 6th Canadian Division, it was organized along US Army lines. It had three infantry brigades or "regiments" and was composed primarily of volunteers. Many were from the European Theatre, using it as a means of getting home quickly as the war in Europe closed down. By August 1945 it had 2,000 officers and 22,000 other ranks located in nine camps across Canada. Since all the soldiers were well-trained and experienced, the only training required was familiarization with US weapons. Training was well under way when atomic bombs brought the war to a quick conclusion and all hostilities ended on 14 August 1945. On 1 September orders were issued for the disbandment of the Canadian Army Pacific Force. The next day the unconditional surrender document was signed, six years and one day after Hitler's armoured divisions had marched into Poland.[38]

Canada soon started dismantling her armed forces in expectation of "peace at last".

34. Minutes of RCEME Conferences 1944-1955; 1945, page 125.
35. Stacey, op.cit., page 510.
36. *Canadians Radar in the South Pacific*; privately published, page 3.
37. *Canadian Army Training Manual*; DND publication, No. 60, March 1946; page 30.
38. Stacey, op.cit., pages 515 and 518.

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SOLDIER-TRADESMEN FOR PEACE

Over the course of half a century, 90,000 Canadian servicemen and women have served on peacekeeping missions around the world. On 8 October 1992, the Governor-General of Canada, the Right Honourable Ramon John Hnatyshyn, unveiled the Peacekeeping Monument in Ottawa. Many of those who marched in the contingents of peacekeeping veterans at the ceremony were Craftsmen.

Montage, clockwise from top left: - UN medals presentation - the Congo, *DND*; Changing an AVGP engine - Somalia, *unknown*; a M578 moving a Russian BMP - Rwanda, *Cpl S. Muirhead*; weapons repair - Cyprus, *DND*; *bottom:* vehicle recovery and inspection - Korea, *DND*.

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Tank turret repair - Korea. Sherman ARV Mk II M32B3 with 60-ton main winch and frame boom with 10-ton winch. *LCol F.W. Chapman*

Making a Craftsman's life easier - Korea. Fernets' showers made by 191 Workshop personnel. *DND*

Radio repair - UNEF1. Tels shop of 56 Canadian Infantry Workshop. *DND*

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Local Vehicle modification - Cambodia. Maintenance Section 92 Canadian Transportation Company manufactures a ballistic protection plate for the Company's 75 task trucks. *Cpl A. Bersford.*

Vehicle Recovery - Cambodia. A MLVW of 92 Canadian Transportation company is recovered across the Mekong River. *Cpl A. Bersford.*

Military Aid - Tanzania. Staff/Sergeant R.E. Willard instructs two Tanzanian vehicle mechanics at Colito Barracks, Dar-es-Salaam 1965. *DND*

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EME as an UNMO. *Left:* Captain J.P.A. Lamy ready to start out on a patrol; *right:* view of his UN outpost.
Captain J.P.A. Lamy

EME identity wherever we serve. EME Section on the airfield at Qatar, Canada Dry Two - Gulf War 1991.

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Craftsmen often work in small isolated workshops - Central America and Iraq. Workshop shelters, tents, sea-containers and/or Paul Bunyons are used in *left* Sergeant R.F. Kendrick's amd Master/Corporal B. Murphy's workshop in San Salvador. *M/Cpl B. Murphy; and right:* Master/Corporal L. Forder's workshop in a hotel courtyard near Sulaymaniyah, Iraq 200 kilometres north of Baghdad. *M/Cpl L. Forder*

Record of first deployments and pride in a job well done - *top;* Maintenance Platoon CANLOGCOY, "The Golan Heights Pioneers" - 1974 UNDOF *Maj C. Churchill* and *bottom;* 4 Combat Engineer Regiment Maintenance Troop - 1992 UNPROFOR

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Commemorating fallen comrades - *Above;* members of 56 Canadian Infanrty Workshop fire a farewell salute to Craftsmen J.M. Albert and D.S. Roster at the Gaza Military Cemetery November 1961; *Below:* the Maintenance Platoon names their sports field in Camp Ziouani, Larose Park, in honour of Corporal G. Larose who died May 1993

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The control office of the EME Workshop in a hanger at the end of the airfield; the badge was drawn and painted by the Craftsmen as soon as the workshop was set up - Haiti 1995. *Capt E.D. Fraser.*

UN medals parade - Cyprus. The EME Colonel Commandant, Colonel M.C. Johnston, presents UN medals to the Maintenance Troop 2RCHA May 1993

Peacekeepers' sports days - UNPROFOR. Maintenance Troop 4 Combat Engineer Regiment wins the Regimental Tug-of-War spring 1992

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War torn workshop accommodation - UNPROFOR no doors, no heat, broken windows and shell-damaged roofs and walls in *top;* Camp Pollum - winter 1992; *bottom;* Visiko - winter 1993-94. *Capt M. Sanchez.*

The tragedy of war - what Canada's peacekeepers encountered in the 1990s - UNPROFOR. Burned out Canadian UNPROFOR vehicles near Daruvar, Croatia summer 1992. *Cpl R.W. Herrington.*

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The danger of peacekeeping - a Canadian vehicle destroyed by a mine - UNPROFOR. The 1¼-ton vehicle in which Sergeant Ralph was killed 17 August 1992. *MWO B. Maddin*

Opening ceremony for a UN workshop built by Craftsmen - UNPROFOR. *Top;* Master/Corporal G.E.M. Semegen reads the lesson at the opening of the Maintenance Platoon's workshop building 1 Canadian Contingent Support Group 20 March 1993. *Sgt G.E.M. Semegen*; *bottom;* Master/Corporal J.A.S. Avoine and Corporal R. Gouin take a break from chain saw and cleaning while behind them two technicians change an engine on a MLVW the autumn before as construction started. *Sgt R. Gilbert.*

Engineering in the Field - UNPROFOR.- applying ceramic tile armour enhancement;

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A UN workshop - UNPROFOR. Maintenance Company Maintenance Company Canadian Logistics Battalion, Camp Luka Sibenik, Croatia. *Maj T.J. Davis*

Heavy equipment recovery - UNPROFOR. Zettelmeyer being lifted by a Leopard ARV (Krauss-Maffei improved) with 20-ton rotating boom, 35-ton winch and rear-deck which can carry complete tank power pack. *M/Cpl B. Graham.*

Mobile Repair Teams - Somalia. Bison MRT (8x8) Armoured Vehicle General Purpose with 10-ton Capstan crane front and rear pull and 4½-ton HIAB crane.

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Making life easier - Somalia. The FCS section makes a washing machine for the platoon. *WO S. Richard*

Pride in their unit - Somalia. The Airborne Maintenance symbol on the wall of the platoon's living quarters in Belat Huen - 1993. *WO S. Richard*

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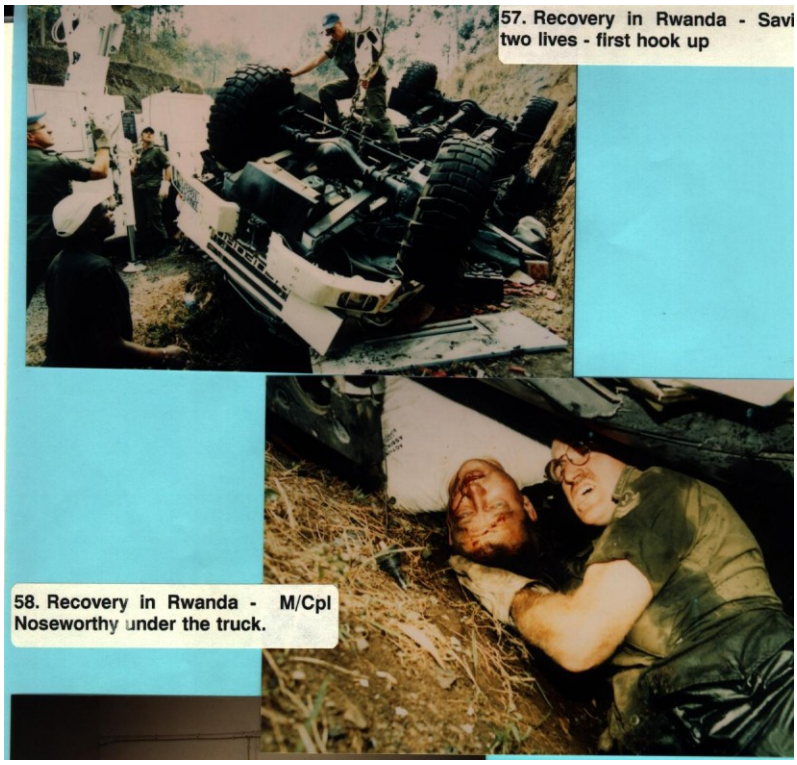

Humanitarian assistance - recovering a vehicle to save lives - Rwanda 1995. *Top to bottom:* Lifting the vehicle to release the trapped drivers; Master/corporal R.B. Noseworthy goes under the vehicle to pull out one of the drivers; Two lucky drivers thank two of their rescuers, Master/Corporals R.B. Noseworthy and C.J. Trepannier. *Mr. S. Dillon.*

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7

Chapter 7 - ASIA

The Korean War, UNMOGIP - India/Pakistan,
ICSC-Cambodia/Laos/Vietnam, ICCS - South Vietnam,
UNAMIC and UNTAC - Cambodia

The Korean War

On 7 August 1950, the Prime Minister announced the decision to recruit the Canadian Army Special Force (CASF). The reaction abroad was favourable, endorsing the Canadian "decision to answer the UN appeal for ground troops in Korea."[1] Canada's Craftsmen would soon be in action again. But this was to be a strange battleground. Korea was no war in which to defend the homeland - rather it was a war like a police action, the first of many in which Canada would be involved in order to insure world peace.

But as the campaign dragged on, the 'citizen-soldiers' who had enlisted 'for the duration' were gradually replaced by professional soldiers. From this developed, for the first time in Canadian history, a professional expeditionary force.[2] Canada's Craftsmen were coming of age.

Campaign Outline

On 25 June 1950, armed forces of the Democratic Peoples' Republic of Korea advanced south across the 38th parallel and attacked the neighbouring Republic of Korea. Within a very short time, three-quarters of a million men were locked in a raging running battle that ranged the length of the Korean peninsula three times within the year. On 8 August 1950, the formation of 25th Canadian Infantry Brigade (25CIB) was announced. By 7 November, an advance party had landed in Pusan. The brigade's first battalion, 2 PPCLI, followed in December and was in action by mid-February, winning a USA Presidential Citation at Kap'yong in April 1951.

By early May, the remainder of 25CIB had landed in Korea. Three weeks later, the brigade went into action as part of 1 US Corps on the left of the UN line. By 10 July, the battle lines had stabilized on the 38th parallel as peace negotiations began. Mobile battle subsided to static warfare as 1½ million men faced each other from hilltop positions and patrolled the flats and river valleys below. On 28 July 1951, the 1st Commonwealth Division was formed, making it the first of its kind in history. 25CIB became one of its three brigades and continued to garrison the line. The peace negotiations dragged on for two years until the Korean Armistice Agreement was signed on 23 July 1953. On 8 November 1954, Headquarters 25CIB closed and, except for one infantry battalion and supporting troops, Canadian units began to leave for home. By early 1956, all troops back in Canada.

Combat Service Support

25CIB landed with 1500 vehicles and 2000 tons of stores - much of it American.[3] There were 8,000 men in the brigade of which 300 Craftsmen comprised a full scale of first and second line RCEME units augmented by a DADEME and a support workshop for third-line repairs. US facilities were designated for heavy repairs.

However, the terrain with its sharp peaks, boggy valley bottom rice paddies, tortuous muddy roads

1. Wood, LCol **H.F.**; *Strange Battleground*; The Queen's Printer, 1966; page 23.
2. Wood, op.cit., page 258.
3. Wood, op.cit., page 93.

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with many steep grades and few bridges dominated the battle, forcing wide dispersion among front-line units and, more importantly, wide separation between combat units and combat service support units. Flexibility and adaptability were the challenge of Canada's Craftsmen and they distinguished themselves by recovering tanks under fire, developing new methods and organizations for repairing and maintaining equipment, and backloading equipment and vehicles over long distances in appalling road conditions.

On 21 May 1952, the dozer tank of C Squadron LdSH(RC) became stuck while preparing a road in the forward company area of the 1st Battalion PPCLI. The situation was precarious since the immobilized dozer was in full view of the enemy positions, a scant half mile away across the river valley. The armoured recovery vehicle commanded by Sergeant T. Allen was called forward. Almost at the same instant that the recovery vehicle arrived at the site, enemy artillery began to range on the vehicles. Linking up two cables and preparing the dozer for the recovery was slow and tedious. Several times the vehicles were hit and the crews ordered to take cover. Sergeant Allen refused to take cover until he had finished directing his ARV and its crew to safety. The dozer was recovered intact that night. Sergeant Allen was awarded the Military Medal.[4,5]

During the fall of 1952, Lieutenant A.C. Leonard served as the RCEME officer with B Squadron LdSH(RC). During the extremely heavy shelling of the Canadians' positions during this period, he was required to recover many damaged tanks from forward positions, often under enemy fire. In one case, he and his recovery crew continued to extricate a bogged tank by daylight even though the enemy shelled the tank in its exposed position with observed fire. In addition, he suggested and developed new modifications to increase the fighting efficiency of the tanks. Due to his untiring efforts, the mechanical fitness of tanks was excellent. Lieutenant Leonard was appointed a Member of the Order of the British Empire.[6]

In the fall of 1951, two Canadian half-track vehicles were temporarily lost in the flood-swollen Imjin River. Covered by a screen of infantry and tanks, the recovery crews, under the command of Captain H.E. McLaughlin of 193 LAD, worked nearly all day in "no man's land" to retrieve the vehicles. They were aided by a motor launch. The crews attempted four times to haul a cable across the fast-flowing river only to have the line snag and foul on the bottom. Finally, using a light wire, the cable was pulled across and attached to one of the half-tracks. The powerful current swept right over the top of the vehicle at one point as it was slowly hauled out. The whole procedure was repeated and the second vehicle was recovered. Captain McLaughlin was appointed a Member of the Order of the British Empire.[7,8]

191 Canadian Infantry Workshop (191 Workshop) landed as part of 25CIB at Pusan on 4 May 1951. The unit was allocated a muddy compound on the outskirts of Pusan. Yet within two weeks, the unit had sorted out a mountain of boxes, crates and stores including 120 tons of spare parts, with the help of 25 Canadian Support Workshop (25 CS Workshop), and was on its way north to the front. Four days and 300 miles later it arrived in the brigade area just south of Seoul. By the next day, it was set up and ready for work as the brigade went into action for the first time. This was indeed combat service support - RCEME![8,9]

Staging Camp and Preparation

After the authorization of the CASF in August 1950, recruiting began and individual training was conducted at home stations throughout the summer. Meanwhile, arrangements were made to use Fort Lewis, Washington as a staging camp for embarkation from Seattle and as a training camp for collective training.

Colonel C.R. Boehm, DME at AHQ, was appointed Commandant. His responsibilities included the administration of the staging camp staff, general Canadian camp administration and housekeeping for CASF units. Others from DME on the camp staff included Lieutenant-Colonel R.H. Ramsay as AA&QMG, and Warrant Officer (Class 1) H. Popkin as Chief Clerk. Colonel Boehm's staff arrived in mid-October and a month later, during a one-week period, 22 trains arrived bringing the 6,000 members of 25CIB.[10,11]

A Staging Camp AWD was formed. It was composed of thirty all ranks drawn from AHQ and units from Halifax to Whitehorse, as well as personnel from the Armoured and Ordnance Corps under the

4. Sgt Allen's Citation.
5. Chapman, LCol F.W.; taped interview with the author, 1983; location 1 to 44.
6. Lt Leonard's Citation.
7. Capt McLaughlin's Citation.
8. RCEME Quarterly 3/4, page 4.
9. RCEME Quarterly 5/1, page 23.
10. Wood, op.cit., page 45.
11. RCEME Quarterly 3/1, page 10.

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command of Captain S.G. Tait with Warrant Officer (Class 1) E. Ellik as ASM. The AWD's job was to modify American-type vehicles, adapting them to the Canadian role. The preliminary information supplied by directorates at AHQ was useful as a guide, but due to minor differences in nearly every type of vehicle as well as policy changes, the well known RCEME versatility was often required.

Preparation for the ocean voyage to Korea was a double-barrelled job for 25CIB RCEME units - assisting with overseas shipping of unit equipment and packaging RCEME equipment - all in accordance with unfamiliar US techniques. These required that batteries be removed from all closed vehicles and crated, engines be preserved and sealed, tools preserved and boxed, undersurfaces coated with preservative, windshields crated, radiators covered, superstructure and tarpaulins removed and packed, and all openings taped and sealed. AFVs were sealed and ventilated or hung with desiccant. After all this, the vehicles had to be moved about sixty miles to the docks. Considerable assistance from US installations, along with a certain amount of ingenuity and a great deal of hard work, saw this accomplished. The stores and equipment were delivered to port and the troops ready to load.[12]

In early April, the brigade's equipment was loaded into six cargo ships and a week later the brigade embarked on two troopships. The staging camp at Fort Lewis, its work done, closed on 15 May 1951.

Organization and Operations

25CIB initially had approximately 250 Craftsmen who were organized into several units. 191 Workshop under command of Major R.E. Hallum was responsible for second line repairs for 25CIB. 25 CS Workshop under Major R.C. Lane was responsible for repairs to rear area equipment and overflow work from 191 Workshop. 192 LAD under the command of Captain R.C. Rivers supported 2RCHA. 193 LAD under the command of Captain McLaughlin supported Brigade HQ. A special increment for C Squadron LdSH(RC) was commanded by Lieutenant Leonard. In addition, there were attached personnel to most other units. At Brigade HQ, Major A.R. Lewis was the DADEME. After 1st Commonwealth Division was formed, 25 CS Workshop was disbanded, the DADEME became 2IC CREME and recovery and telecommunications equipment repairs were pooled on a divisional level. 25 CS Workshop had been formed to assist in bringing equipment to Pusan and to offer a third line repair capability for uniquely Canadian items from 191 Workshop. However, backloading procedures in the Division forced most of the work to go to Japan. Hence, it was phased out.[5]

In the weeks that followed its arrival at the front, 191 Workshop occupied various positions between Suwon and Seoul. On 20 May 1951, the unit was sited at "K-town" twelve miles behind the front lines. Then in early June, with the front lines moving ever northward, it advanced to Uijongbu (more correctly Parunee, a small village in the area of the town of Uijongbu). A few weeks before, this region had been the scene of bitter battles between the Communist hordes and the UN forces.[8]

When the Commonwealth Division was formed in July 1951, the 2IC CREME was a Canadian. Much of the equipment provided to the division was American versus British. As the front was relatively static at the time, pooling of repair resources on a divisional basis would have been difficult and leap-frogging of workshops was unnecessary.[13] Consequently, the second line repairs for 25CIB's equipment continued to be carried out by 191 Workshop.

There were two circumstances wherein EME services were integrated on a divisional basis. The first was vehicle recovery. Because of the terrain, brigade workshops were located 20 to 35 miles behind the units they supported. Roads were few, poor and heavily used in support of all of the division's brigades. Therefore, 1st Commonwealth Division Recovery Company was formed. It included four of the six recovery vehicles and crews of 191 Workshop. The Company's mission included backloading from LADs to brigade workshops and further back if necessary. This allowed LADs to concentrate on forward recovery. In one four-month period, the Company organized the backloading of nearly 2,500 vehicles to brigade workshops and manned recovery posts on the Imjin river bridges and other defiles where gradients often exceeded 1 in 4.[14]

One time, a 191 Workshop recovery crew recovered one of the workshop's own vehicles in the

12. RCEME Quarterly 4/2, page 11.
13. RCEME Quarterly 4/1, page 5.
14. RCEME Quarterly 4/4, page 6.

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forward zone. This particular operation was interrupted three times by mortar fire.[12] Because of the poor roads, the recovery crews had to use two recovery vehicles. The time, distance and effort to recover this vehicle was one of the main reasons for integrating recovery resources services in the division.

There was also an Infantry Troops Recovery Unit (ITRU) in Seoul. Canadians served in the ITRU, which backloaded equipment from 191 Workshop to US Army turn-in points or, in the case of British equipment, to Inchon for sea transport to Kure, Japan where there was a British base workshop. Not much Canadian equipment, however, went this latter route. The second circumstance requiring integration of services was repair of telecommunication equipment. The high failure rate combined with the greater than normal use of this equipment in the Korean Theatre overburdened the telecommunications sections of the brigade workshops. Consequently, all the divisional telecommunications resources, including 191 Workshop's, were combined to form 1st Commonwealth Division Telecommunications Workshop.[12] "This made specialization possible so that production was increased sufficiently to keep ahead of the workload," noted Craftsman R.E. Goulding. In one three-month period, this workshop, which included ten Canadians, repaired nearly 1,400 radio sets.[15,16]

In 1952, a year after 1st Commonwealth Division had been formed, Lieutenant-Colonel H.G. Good, REME, the Division's CREME, commented to his 2IC, Major J.R. McLarnon RCEME, "The combination of REME, RCEME, RAEME and RNZEME working side by side in a joint endeavour is a grand and proud experience. To work as a Commonwealth Division is no more of a problem than in any other Division." It was logistic integration internationally while retaining national identity. {As well, Canada's soldiers often had to be diplomats and tradesmen at the same time.}[13]

The long distances and heavy going of muddy roads took their toll on the vehicles during the first year. Consequently, Brigade HQ ran a vehicle inspection program in the summer of 1952. Over a period of three weeks, the team of 23 drawn from all RCEME units spent two days in turn at each unit and inspected all the vehicles. Finding a flat piece of ground on which to do this was rare in Korea. One unit used a football field it had built while in a reserve position. The program gave a great assist to unit mechanics, helping them to catch up on their work and improving the RCEME support for the brigade. This team approach had been used successfully in World War Two. Its continued use helped to foster the RCEME spirit.

A Craftsman's Life

On arrival in Pusan in May 1951, 25 CS Workshop set up shop "as a makeshift static second-line workshop" in an ex-POW camp surrounded by hills, rice paddies and the all-pervading smell of night soil. Lieutenant R. Hill wrote that "a real estate agent would probably describe it as a choice site in a rapidly developing suburb of Pusan, but it left something to be desired as the location for a Base Workshop. Eight hours after our arrival, the work started to pour in. As it was nearly all connected with the movement of the brigade to the front, it was urgent and had to be done. The resulting combination of setting up shop, unpacking stores, chasing spare parts through formal and informal American channels, and trying to operate as a workshop with equipment that was still in the process of being depreserved, gave the general impression of a madhouse."[17]

Somehow, the work was done and some of the spare parts procured. Much credit is due to the individual tradesmen and SPSS storemen who turned out the jobs, despite tool and equipment shortages and very trying circumstances. The Craftsmen of 25 CS Workshop all heaved a big sigh of relief when the brigade moved north to the front.

But long hours continued for a while at least. Warrant Officer (Class 2) H. Gallien of 191 Workshop noted later that summer, "Work starts at 0715 hours and goes right through until about 2100 hours or later if necessary. And, now and again, it does become necessary. Needless to add, we do stop for meals." An Italian campaign veteran, he even compared the weather to Italy, "If it's clear and hot, we have dust by the ton and, when it rains, we are practically knee deep in mud."[17]

In the spring of 1952, Captain E.P. Bishop was the OC of 192 LAD. His LAD was located about

15. RCEME Quarterly 3/3, page 4.
16. RCEME Quarterly 4/3, page 32.
17. RCEME Quarterly 3/3, page 4.

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three miles north of the Imjin River and about the same distance from the Canadian FDLs. He noted, "This was too close for comfort, since we get some of the 'overs'. All our shelters for living and working are made of canvas. No civilian buildings are available because they just can't be called buildings. There is not even a brick or stone wall in the lee of which a man can rig a tarpaulin for shelter. There is no shortage of hills in this country. The boys find it quite handy to dig into the hill and, with a small tarpaulin, fashion a fairly cosy shelter. There are literally thousands of these hillside living quarters. Nevertheless, the winters, although not as severe as Canada, were felt much more keenly by the troops because of the conditions under which they lived." He compared it to living in a hole in the side of the hills behind Hull during the winter.[16]

Life was easier in 191 Workshop, which had an establishment of seven officers and 117 men, including those detached to the two divisional units. As Major Hallum noted, "Food in the camp was excellent. All ranks could have two quarts of beer per day. We had a good library and a motion picture at least twice a week. There were no enemy planes droning overhead and no hostile artillery barrages. Each man had a folding cot and a good tent over his head. Our mosquito and fly control was excellent. Notwithstanding the comparative safety from enemy action, we observed strict blackouts and, because of possible guerilla activity, put into effect a system of all-round defence that would work. 'Just in case,' all ranks had to have slit trenches."[8]

But as he also noted, "The construction and use of the Fernets' portable shower bath was the chief contributing factor to the morale of the personnel. This 'Heath Robinson' contraption conceived and built by Warrant Officer (Class 1) J.M. Fernets and Warrant Officer (Class 2) A.M. Rivers was capable of showering 200 men per hour and holding 700 gallons of water. After 25CIB joined 1st Commonwealth Division, the shower was frequently patronized by officers and men of the rear Divisional Headquarters and for a change it was nice to see a vehicle draw up to the control office with its occupants wanting nothing more than the opportunity to put to use the clean towels they carried over their arms. "For this and other occasions, ...when he went beyond his required scope and expended much of his free time to the comfort and welfare of his men," Warrant Officer Fernets was appointed a Member of the Order of the British Empire.[8,18] By 1953, life had settled down to a routine and life had improved as Lieutenant E. MacMillan noted. The men of the artillery LAD were housed in American squad tents with wooden floors. The messes and canteens had lights. There were nightly movies. Many of the officers employed Korean houseboys. The workshop employed about 90 Korean civilians. The workload was mainly vehicle repairs due to the many unit exercises being conducted.[19]

Welfare of the troops was a big issue at this time. Gift shops operated from dozens of locations and the men spent many hours travelling from one to another, selecting suitable gifts to send home. Cameras, binoculars, fishing tackle, pearls and kimonos were the order of the day. Units were visited by Army shows Visitors included Prime Minister St. Laurent (the reception cost each officer $2.00) and members of the Stanley Cup champions - the Detroit Red Wings - including Gordie Howe and Red Kelly who visited all Canadian units showing films and talking to the men.[19]

The recovery driver's life was unique and is typified by Craftsman R. Sutherland, a member of the LdSH(RC) increment, who often had to answer calls from stalled vehicles "somewhere in Korea." Between the enemy and slippery roads, the job of recovery assumed such proportions that it required the services of an AWD from the workshop which put in many long mud-encrusted hours. But it was the spirit that made RCEME's reputation.

Production - A Proud Record

In the two years from May 1951 when the brigade went into action, until the armistice was signed in 1953, the 150 Canadian Craftsmen of 191 Canadian Infantry Workshop compiled an impressive record of 22,000 field repairs, including 440 combat vehicles, 3,500 trucks and engineer equipments, 160 guns, 320 small arms, 290 instruments, and 4,200 miscellaneous equipments.[20] To this total must be added the 7,600 radio repairs done by the Canadian section of the divisional telecommunications workshop.

In addition, the 100 Canadian Craftsmen in the units and LADs carried out innumerable recovery

18. WO1 Fernets' Citation.
19. MacMillan, Capt E.; unpublished notes, 1975; page 2.
20. Wood, op.cit., page 177.

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and repair operations, often in the face of the enemy. They also backloaded equipment over terrible roads and inspected equipment near the front lines. It was production - a proud record!

Postscript

In recognition of the sacrifice Canadian soldiers made in Korea and the fact that it was indeed a war, the Canadian Government issued a Korean Volunteer Service Medal (KVSM) in 1992. That year and the next, several RCEME Korean War veterans were awarded their KVSM medal on EME parades. Some of these veterans were still serving as civilian members of EME workshops or project teams. It was appropriate recognition and a proud moment for all.

UNMOGIP - India/Pakistan

War between India and Pakistan broke out in August 1947. A cease-fire was arranged by January 1949. In July, the United Nations Military Observer Group in India and Pakistan (UNMOGIP) was established with about 40 truce observers. Canada's contribution of nine had been reduced to one by 1978, noted Lieutenant-Colonel P.P. Pospisil, the senior Canadian observer at the time.

The truce observers were to investigate cease-fire line violations such as troop strength increases and firing incidents on both sides of the cease-fire line. The cease-fire line according to Colonel A. Mendelsohn, an observer in 1959-60, was an unmarked line which generally travelled from peak to peak on mountains often extending to 15,000 feet in height.[21] However, noted Major J.N. Pinder-Moss, an observer in 1963-64, the line often ran in the valleys which interrupted the use of the arable land.[22] The line often split families and farms with the local populace taking advantage of the situation to acquire each others' crops, etc. Consequently, incidents involved crop destruction, house burnings, kidnappings, etc. The observers were constantly on the go trying to find out what was going on. Many times, it was difficult to get to the scene of an alleged violation.

In one incident on the northwest part of the cease-fire line, Colonel Mendelsohn walked - from the 5,000 foot level of his outpost in soft snow subject to avalanches - over a pass at the 11,000 foot level and down the other side into a farm area comprising terraced, irregularly-shaped rice paddies laid out on a hill side sloping down from the Pakistan side. The cease-fire line ran right through the area, splitting some of the rice paddies, and there was an argument as to its exact location. As he arrived, the farmers were getting ready to assail each other with sickle and scythe. Enlisting the help of the accompanying Indian and Pakistani officers, he got the two groups separated. He then arranged an agreement on a cease-fire line and had the farmers lay rocks across the paddies to mark it. The line was respected, but as his tour ended he became aware of new problems as to who owned the harvest and who irrigated the land.[21]

The opposing sides' forward outposts were located on hill tops about 1,000 metres back from the cease-fire line with good visibility of opposing and neighbouring outposts. The truce observers' posts were about 20 miles back. They came forward regularly to inspect, giving appropriate notice beforehand. As Major Pinder-Moss noted, he often heard firing but it stopped as soon as his white jeep came in sight.[22]

ICSC - Cambodia/Laos/Vietnam

In 1954, an international conference met in Geneva to draw up terms and conditions by which France was to withdraw from Indo-China. The conference agreed to and sponsored three cease-fire agreements, one each for Cambodia, Laos and Vietnam. An International Commission for Supervision and Control (ICSC) was formed to supervise each agreement. (Although never formalized, the term ICSC for Indochina was often used as a collective term for the three commissions.) Each commission had three delegations - Canada, Poland, and India - with India being responsible for administrative arrangements.

21. Mendelsohn, BGen A.; taped interview with the author, 1983; loc 397-430.
22. Pinder-Moss, Maj J.A.; taped interview with the author, 1975; loc 115.

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Truce observers

By the time the cease-fire agreements became effective in September; the commissions were prepared and represented on the ground. The initial tasks were to ensure that the cease-fires were obeyed, order restored, and the military forces of the disputants transferred to their respective zones.[23] This was done quite successfully, as noted by Major A.L. Maclean, a team-site officer at Kampot on the sea coast of Cambodia, and Major C.G. Provan, an operations staff officer in Hanoi, Vietnam.[24]

The agreements also required the commissions to control the entry of military personnel and war materiel. This was the main task of Captain F.A. Ouimet, a team-site officer in Vietnam in 1957 and later in Cambodia. His first task, along with Major R.C. Rivers, was running patrols on the Ben Hai River which was the dividing line between South and North Vietnam.[25] The continuing problem, however, was kidnappings across the border. Consequently, much of their time was spent listening to petitions requesting that they find missing people.

A few months later at Tien Yen in North Vietnam near the Chinese border, the surveillance of war materiel was Captain Ouimet's main task. In one incident, over a period of a couple of weeks he watched "no end of barbed wire being unloaded from sampans and carried by peasants up into the hills and hidden in caves." He was told that the wire was "for penning-in cattle and therefore was not war materiel." In Phnom Penh, Cambodia he later had to convince the Polish delegation that a 75mm gun barrel in a box bearing USA lend-lease markings really was a milling machine as labelled.[25] The control of war materiel was not always successful!

By the mid-1960s, the strengths of the commissions had been greatly reduced. In Laos, the field teams had been withdrawn and only a headquarters element remained. Brigadier-Generals K.H. McKibbin and A. Mendelsohn were the Senior Military Advisers in 1964-65 and 1968-69 respectively. Of great advantage to the Canadian delegation at that time, noted General Mendelsohn, was that Vientiane boasted embassies from North Vietnam, South Vietnam, Russia, China, UN, Red Cross, etc, thus being the only place where all nations could communicate face-to-face informally on any matters relating to Asia.[26]

RCEME Technicians

There was usually a RCEME vehicle technician as one of the several corporals on the staff in Laos. These soldier-technicians performed the dual role of their specialty and guard duty, providing part of the 24-hour guard on the Canadian delegation's headquarters. In his off-hours, the RCEME technician helped with the maintenance of the vehicles assigned to the Canadians and, as well, repaired everything else in the delegation.[26]

ICCS - South Vietnam

On 27 January 1973, after years of seemingly endless discussion and argument, the parties participating in the Paris Conference signed an agreement ending the war and restoring peace in Vietnam. They established an International Commission of Control and Supervision (ICCS) in South Vietnam. The commission had four delegations: Canada, Hungary, Indonesia, and Poland, with Canada providing about 280 members.

Truce Observers

In early December 1972, Lieutenant-Colonel R.B. Screaton, Major J.D. McDougall and Captain G.W. Godson were assigned to Operation GALLANT to take part in planning for a possible Canadian deployment to South Vietnam as part of a new supervision and control commission. While preparations were being finalized in Montréal, Captain Godson departed for Saigon as part of a two-man advance party that was to confirm initial logistic support for the Canadians. This task was begun immediately on their arrival, no time for acclimatization being allowed. When the first group of the delegation arrived at 0330 hours on 29

23. Goodspeed, LCol D.J.; *The Armed Forces of Canada 1867-1967*; Queen's Printer, Ottawa: 1967; page 246.
24. Eayrs, James; *In Defence of Canada: Indochina - Roots of Complicity*; University of Toronto Press, 1983; page 300.
25. Ouimet, Capt F.A.; taped interview with the author, 1983; loc 20-160.
26. Mendelsohn, op.cit., loc 190 to 234.

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January, Captain Godson was there to greet them.[27]

Within hours of landing, the headquarters in Saigon was in operation. It somewhat resembled a battle group HQ but with some refinements, noted Lieutenant-Colonel F.W. Chapman. Initially, the first priority of his plans staff was to develop deployment plans and to ensure that Regional HQ and team sites were established as quickly as possible in accordance with the protocols. Once the HQs were deployed, the reception and indoctrination of the second group, mainly team site members, became the prime concern.

On 5 February 1973, the ICCS deployed a Region HQ team to each of the two Mekong Delta regions. The deployment was the first major contact at the working level among the delegations. This early period was marked by politeness, friendly social contacts and a concerted joint effort by all four delegations to get the regions set up and functioning. Operational procedures had to be devised and team sites built or renovated so that team site officers could be deployed quickly to their areas and begin the work of the Commission. In the Delta, this was all completed by the end of February, noted Colonels Screaton and M.C. Johnston, the Commanders of the two regions.[27]

The sharp end of the ICCS investigations was the team-site officers operating throughout Vietnam. No team-site could be described as typical. Some were peaceful and quiet while others were surrounded by fighting. Some were reasonably comfortable, while others were extremely primitive and others were dangerous. For example, Major F.R. Bulmer had been detailed to go to Gio Linh, a team-site in Viet Cong territory just south of the Demilitarized Zone. In fact, the site was never manned due to a lack of accommodation in the area, which had been heavily bombed prior to the cease-fire. Major Bulmer stayed, with bags packed, in tented accommodation at Quang Tri, 20 kilometres south on the Thach Han River, while preparations continued at Gio Linh. Quang Tri had been taken by the North Vietnamese / Viet Cong and retaken by the South Vietnamese forces shortly before the cease-fire, and had been destroyed in the process. This resulted in a tense stalemate, with the North controlling one bank of the river and the South the other. Movement was restricted and activity was very limited. This was not a choice team-site. Getting to it was a problem involving distance, arrangements, security clearances etc - and danger. The Thach Han River was mined, with only a narrow place cleared for the crossing. On one occasion, Major Bulmer noted, the engine of the ferry boat usually used by the ICCS to cross the river failed, and the boat drifted 100 feet downstream from the normal crossing and struck a mine. There were no ICCS personnel aboard at the time, but two people were killed.[28]

"What really hindered the mission was the unanimity rule," Colonel M.C. Johnston recalled. The Canadian Region Commander in the southern Mekong Delta continued: "All four delegations had to agree unanimously to any decision to start an investigation of an alleged violation of the peace accords or to make a conclusion after an investigation. Of the many requests for investigation, few were started and even fewer were finished. We had to take advantage of every opportunity." On one occasion the Polish and Hungarian delegations in the team-site at Triton near the Cambodian border feared an attack by the North Vietnamese division, which garrisoned the hills around the town. They abandoned the team-site by seizing the resupply helicopter, leaving the Canadian and Indonesian team members behind. The Canadian delegation's medical assistant Sergeant was acting as the helicopter's crew chief. "When he informed me by radio," recalled Colonel Johnston, "I replied that I and the Indonesian Colonel would immediately return to Triton and begin unanimous, albeit two-delegation, investigations and reports. We quickly submitted these to commission headquarters in Saigon and eventually to Paris where they caused quite a ruckus. The Poles and Hungarians claimed that the investigations were invalid. However, the whole matter drew worldwide attention to what was really going on. They quietly redeployed back to Triton a couple of weeks later." The point had been made. The commission could not carry out its mandate under the conditions imposed by the peace accords.

By the end of May, Canada announced that it would withdraw from Vietnam by 31 July. This was done but not without a few problems. For example, three days before departure one of the C-130 Hercules transport aircraft being used to evacuate equipment became unserviceable. It was decided to move some equipment to the Philippines and pick it up later. Captain Godson and two NCOs accompanied a load of military stores to the Philippines and six days later left for Canada. As soon as the Canadians arrived home, a small group, including Colonel Screaton, started preparing the final report of the ICCS. It was finished by the

27. ICCS LORE Team; *Canadian Land Ordnance Engineers in Vietnam 1973*; Canadian Quarterly, Issues 5/1 and 5/2, 1975; part 1, p 46.
28. ICCS LORE Team, op.cit., part 2, p 34.

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time Captain Godson reported into NDHQ and made the final entry in the ICCS Peace Diary, thus closing the activities of LORE in the Orient.[28]

On reflecting on this and other similar operations, one might ask why LORE officers were in the operations organization rather than just the support counterpart. One answer suggested by Colonel Chapman is that close liaison and understanding are absolutely essential between operations and support, particularly in the early days of these operations. To provide this liaison and understanding, Canada's Craftsmen, as soldier-engineers, have the necessary skills and flexibility.[29]

Service Support

Early planning for the Commission included the provision of several "service battalions" so that the commission could be logistically self-supporting. The final plan, however, called for logistic support to be provided by civilian contractors. Nevertheless, the Canadian delegation included an element of responsibility for ensuring its logistic support. This was indeed fortuitous because, due to lack of expertise in the other delegations, the Canadians found themselves - as Captain Godson, the delegation's Staff Officer Maintenance has noted - acting on behalf of the entire ICCS rather than just their own delegation.[30]

In Region 7, Major R.P. Britt, the Canadian SSO Support, became by default the Region Support Officer. The Region Executive Committee recognized this and appointed him Region Contact Officer with the contractor. He also became Camp Commandant for the Region HQ. He had many varied problems. For example, during the month of February the contractor provided negligible assistance, almost as if he didn't expect the ICCS to last. Consequently, the delegations were forced to hire interpreters and clerks out of their own funds.

Vehicle markings were also a problem.[31] In February, a proposed marking system was introduced to placate certain delegations who used the lack of marked vehicles as an excuse not to go on investigations. All of the region's vehicles were marked in accordance with the proposed system. Shortly after, Major Britt was informed that a new instruction had just been issued. However, before it was received it was cancelled and a new directive was not received until June. In the interim, in order not to inhibit investigations, Major Britt had to ensure that the original markings were considered correct and official by all delegations so that the vehicles could be used to go on investigations.

Vehicle and Generator Maintenance

The equipment used by the ICCS included 700 vehicles and a large number of generators up to 200 KW in size. This equipment was to be operated and maintained by the contractor. The Commission was to provide a Contracting Officer's Representative to the contractor to monitor maintenance and operation of this equipment. Hence, liaison and inspection - versus repair - became the task of Captain Godson and his staff of two Vehicle Technicians, Sergeant B.J. Vandersteen and Master-Corporal P. Zwaagstra. It was necessary to set up a fairly comprehensive system of monitoring the contracted maintenance to ensure that it was satisfactorily completed. A sort of quality assurance check system was used to confirm this.

There were many difficulties, recalled Sergeant Vandersteen. One was the continuing lack of spare parts. There were no official channels from which to draw, and this left scavenging, black market bartering and scrounging as the only means of getting the much-needed parts. After one visit to the Vietnamese military workshop in Bien Hoa, which was providing some back-up assistance, it was noticed that some vehicles had been waiting for minor repairs for up to 45 days. All that had been done to them was to remove parts like spare tires. Captain Godson paid a liaison visit to the camp commander and soon the vehicles were repaired, complete, and back in operation. The team was also able to scrounge 30 badly-needed jeep batteries against the promise of a small token, a bottle of Canadian whisky.

There was a shortage of mechanics. However, jobs were scarce in the country, and for each job the ICCS had many applicants, not all of whom had the correct qualifications. After a long interview made difficult by language barriers overcome by hand signs, it was disappointing to discover that the candidate for a mechanic's job was really a carpenter. It was also noted that most of the mechanics were not trained to use

29. Chapman, LCol F.W.; report, 1975; page 7.
30. ICCS LORE Team, op.cit., Part 2, page 36.
31. Britt, Maj P.R.; report, 1973.

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the latest test equipment and gauges. However, they turned out to be easy-going and good technicians who could make do and/or patch in order to get along with few parts and tools. One of their innovations, Master-Corporal Zwaagstra noted, was a spark plug electrode protector. This device was used to extend the life of an engine which was burning oil. The electrode did not become fouled because it was partially enclosed by the protector.

On reflecting on this operation, it is instructive to note how maintenance and repairs were carried out at the team-site level. Vietnamese tradesmen and drivers were not inclined to do a great deal of maintenance, but when things broke down, they were ingenious about fixing them. With the low prevailing labour rates and high parts costs, things were torn down and made to work rather than being replaced. Repairs often took a long time, with parts being built up with a hand torch and hand-filed back into shape. What we would regard as expedient was often the normal repair method. This principle is applicable for all peacekeeping operations where Canada's Craftsmen often have to maintain unfamiliar equipment with few tools and parts, but always with ingenuity and initiative.

UNAMIC and UNTAC - Cambodia

"We were there to give Cambodia something that it's never had - democracy - and something it hadn't known for 22 years - peace," reflected Sergeant V. Ashe in 1993 on his return from duty with the United Nations in Cambodia. "At least one million died in the mid-1970s as a direct result of the Khmer Rouge."[32]

Operations Outline

In December 1978, Vietnamese Armed Forces launched a full-scale invasion of Cambodia, toppled the Khmer Rouge government and installed their own government. For the next ten years, the Khmer Rouge kept fighting the Vietnamese, who withdrew in 1989 leaving the country in total ruins. "In late 1991 the United Nations Advance Mission In Cambodia (UNAMIC) was set up to assess the situation," recalled Major J.G.D.F. Brière. The mission was replaced in early 1992 by the United Nations Transitional Authority in Cambodia (UNTAC). UNTAC was set up to run a transitional government, disarm the rebel factions, and administer free and fair elections. UNTAC's budget was between US$3 and $5 billion. It had 18,000 soldiers and 4,000 civilians, the largest mission at that time ever undertaken by the UN. Canada's contribution included Military Observers and 92 Canadian Transportation Company.

Setting Up Shop

"We arrived in mid-April," recalled Master-Corporal M. Couturier, a Materials Technician and member of the Company's 11-man maintenance section. "The unit was located in a former driver training school which was in poor condition. The sheet metal roofs leaked, everything was filthy and the sanitation facilities were insufficient and primitive. We lived in an old barrack hut. Beds were placed anywhere to avoid the leaks. It took us three months to get the place cleaned up. By then, portable shower facilities, washers and dryers, and a mess hall were being brought in."[33]

"The workshop was an open garage with no pits," noted Master-Corporal J.G.M. Deslauriers. "We did oil changes using pans. All the sewage was basically drained out into a swamp at the back. Our tools arrived by ship two weeks after we did. So for the first two weeks we were very limited in what we could do." As Fire Systems Control Technician Corporal M. Herriott recalled, "I took along a few of my personal tools such as a basic multi-meter. In fact, I spent a lot of time setting up a 400-kilowatt, two-phase electrical power distribution system for the camp. We don't normally get to do that sort of work on that scope."

One of the first problems was calcium on the vehicles arriving from Canada. The high humidity and temperature of Cambodia caused a lot corrosion and extra work for the Materials Technician. Master-Corporal Couturier noted, "I had few workshop tools and no benders so I had to do all my work with an anvil and hammer."

32. Ashe, Sgt V.; *EME in Cambodia 1992-93*; unpublished article, 1993.
33. Couturier, MCpl M., Deslauriers, M/Cpl and Herriott, Cpl M.; *The first EME group in Cambodia in 1992*; taped interview with the author, 1993.

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Equipment Maintenance[32]

Maintenance Section 92 Canadian Transportation Company was responsible for the equipment of the company and supported the Canadian Contingent's HQ and river craft. This equipment included 24 MLVWs, ten jeeps, two 1¼-ton trucks, two recovery trucks, two reefer trucks and the contingent's water purifier, as well as various fork lifts, front-end loaders, lawnmowers, chain saws, air conditioners and three photocopiers.

The section's workshop was a large 10-bay concrete pad covered with a sheet metal roof. The welder, FCS technician and radio technicians worked out of their MLVW SEVs, which were parked in the transportation garage. Normal workshop control procedures and documentation were used. The well-stocked tool crib included the section office area.

"The tool crib had its hazards though - snakes," noted Sergeant Ashe. "We had a rack at the top where we stored our hoses and copper lines. One day we found a snake that was 4 feet long and a ¼-inch in diameter. It looked like a vacuum line! One of the civilians working for us said that it is a two-step snake - it bites you, you take two steps and you die - no doctor required. After that, if you came to Cambodia you would never be able to find a vacuum hose!

"There was a six-week turnaround time for spare parts demands back to Canada, so all possible use was made of local purchase. A civilian, hired to work with the FCS truck, became invaluable both in translating and in finding local contractors. The Cambodian contractors rebuilt everything - from alternators to brake shoes, tire repairs and rotation. The wood deck on the section's tilt-bed trailer was repaired locally for US$150 - using mahogany planking! More importantly, the local contractors gave the maintainers a very good insight into the Cambodian people and their lifestyles.

"Initially, getting spare parts from Canada posed a real problem. Resupply flights came in every five or six weeks and landed in Saigon, Vietnam, where they were then reloaded into smaller containers for transfer to Cambodia. The result was missing parts. Often, several were needed to complete a job and only one would show up. The result: another six-week wait. The problem was eliminated in January 1993 when the flights landed directly in Bangkok. This, plus imposing minimum-maximum limits helped a lot in dropping the VOR rate from 43 to 12 per cent.

"Spare parts for lawn mowers were a special problem. In Cambodia, lawns with short grass were very important in minimizing snakes and bugs. For us, lawnmower parts were top priority; but it wasn't the same in Calgary. They were in three feet of snow and freezing to death, and we were asking for lawnmower blades and spark plugs! They thought that we were only beautifying our camp - but we were trying to save some lives!

"Recovery was a very big point. You had to know exactly what you were doing - including reading maps, understanding equipment, and driving wreckers on very small roads and across bridges that wouldn't support a jeep! In crossing the Mekong River, we had to use a floating barge that was pulled by a tug. It was just big enough for a wrecker and a trailer. When we had a MLVW on tow or a casualty on the trailer, we had problems. The ferry Captain feared grounding his barge on the river banks. He would stay out about four feet so the wrecker driver would have to drive off the end into space, hoping it wasn't too deep. As the front wheels went down and hit the water the tug boat driver would pull his barge back, so the wrecker had to maintain the momentum and get up the bank before the barge was pulled out from under him! 'Do we have to go across the Mekong?' was the first thing the crew chief would ask."

Recovery crews always took their weapons, ammunition and food as they were completely on their own. There were no up-to-date maps and no road signs. Delays at road blocks and checkpoints and lack of radio or phone communication back to camp were standard hazards. "Often they didn't know exactly where they were," Sergeant Ashe noted, "but owing to their experience they did an excellent job. On one occasion when one of our wreckers went travelling down to the southern areas in Cambodia, a Russian dump truck pulled out on the road and caused quite extensive damage to our wrecker. We had to replace an engine, hood, fender and body parts. Luckily nobody was hurt since the crew were wearing seat belts. The Russian dump truck - one, wrecker - zero!

Inspecting vehicles had its hazards too. The roads in Cambodia were filthy with excretion from humans, cows and pigs. The undercarriages of the vehicles were packed with mud and dung, and were not

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very pleasant to work on. Before vehicles came into the maintenance shop they were thoroughly steam-cleaned underneath. This also got rid of any snakes or bugs. Any vehicle that sat out for more than two days had to be approached with great caution, not because of any bombs or booby traps, but because of the snakes, bugs and spiders. The procedure was to approach such vehicles with a mallet or piece of wood, walk around the vehicle banging the fenders and the doors to scare away the snakes and bugs, and then very gently open the door.

Mine Protection for Drivers

Mines were an ever-present danger to drivers. The Maintenance Section was tasked to reinforce the floors of the MLVWs as a means of mine protection. After talking and working with the Mine Awareness Staff at UNTAC Headquarters, the section developed a system of using ½-inch steel plates. "Plating from the sides of derelict ships in the harbour at Phnom Penh was the source for a lot of the steel," recalled Master-Corporal R.J. Thompson, a Materials Technician, and Corporal T.E.J. Turpin, a Weapons Technician, who did most of the work. Plates weighing 1,000 pounds were cut and bolted to the frame of vehicles as two separate plates with an air gap. The effect was spaced armour. Installation or removal was easy, requiring only the removal of the cab and seats and only took approximately three hours in 110°F temperature! The total cost was approximately US$850, including labour and metal. The modification of the Canadian vehicles was considered so successful that it was decided to install it in all 700 UNTAC three-ton vehicles. Sergeant Ashe was awarded a UN Commendation for his part in the modification program. His report lead to a project to provide ballistic and blast protection for vehicle crews.

A Craftsman's Life

"My days were full the entire six months that I was there," recalled Master-Corporal Couturier. "Everybody wanted a job done immediately - heat this up, cut that, sew up this seat. Initially there was too much work for the mechanics so I tried to help them out a bit, too. All our spare time was spent cleaning up and improving the camp on a self-help basis. We worked six-day weeks and appreciated our monthly 48-hour leave passes."[33]

The average temperature from October until the middle of January was normally in the mid-30s. From January until April, it varied from 35° to 5°C and was very dry. The monsoon season ran from May to September. The maintainers worked from 0500 to 1300 hours. A skeleton inspection and recovery crew worked a regular 0730 to 1600 day. Usually, the recovery crew would stay around the shop in case there were any emergency calls.

The camp was five acres in size. Living quarters remained in the old barracks hut which, by the time of the second rotation, was cleaned out, white-washed and divided into platoon areas with separate senior NCO and officer areas. Each person had a wooden bed with a styrofoam mattress and bug net. Kit lockers had to be up on pallets because of the rain. The washing and kitchen areas were housed in trailers which had been built in Australia. The messing area was an old jail building that had a well-used outside patio deck area. The modern MIR included an ambulance, a nine-bay sick bay and a doctor. The OR was an old stucco building. Several sea containers were used to store weapons, spare parts and extra kit, and were dug in as protective bunkers. Sports facilities included a soccer/football field, a baseball diamond, horseshoe pits and a volleyball court. There was a lot to do besides work!

"The Canadians were always helping locally," noted Corporal A.R. Beresford. "We helped build the Father Don Bosco technical school and helped raise over US$5,000 for the Canada House Orphanage."

{Combining the monthly 48-hour pass with a day off often made for a three-day leave. Leave was normally restricted to the country, although some went to places like Vietnam and Hong Kong. About four hours south were the white sandy beaches of the Gulf of Thailand. "Sometimes," noted Sergeant Ashe, "We were able to jump on a plane going to Bangkok and a place called U Tapao, enjoy a bit of civilization, do some shopping and bar hopping."}

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Chapter 8 - AFRICA

UNOC - the Congo, CAFATTT - Tanzania, CAFITG - Ghana, UNTAG-Namibia,
MINURSO-Western Sahara, UNAVEM II - Angola, ONUMOZ - Mozambique,
UNITAF - Somalia, UNAMIR - Rwanda

UNOC - the Congo

The Republic of the Congo achieved independence in June 1960 abruptly and without adequate preparation. It was admitted to the United Nations in early July but an insurrection in its army forced it to request United Nations' assistance. Response was quick and the United Nations Organization in the Congo (UNOC) was formed on 14 July 1960.

Initially, requests for Canadian assistance included communication and logistics support. Consequently, a reconnaissance party was assembled and tasked to find and prepare accommodation for the Canadian contribution. Under command of Colonel A. Mendelsohn, who had just returned from UNMOGIP, a party of seven was dispatched on 28 July as Canada approved a contribution of not more than 200 signallers with a maximum contribution of 500 all ranks.[1] Arriving on 1 August via Paris and Brazzaville, Colonel Mendelsohn's party immediately set to work and were ready in time for the advance parties which began to arrive on 9 August. As these troops began to arrive, he was appointed the first Commander, Canadian Forces Congo.[2]

The Canadian contribution to the Congo included a signals squadron which provided communications at UN headquarters and at eight district headquarters, some as far afield as 1,500 miles. The squadron's equipment included jeeps and 2½-ton trucks with communication equipment mounted. Several vehicle technicians were included for maintenance. Although the trucks were used in a static role, maintaining them was made difficult by wide dispersion over trackless jungles, lack of local support and shortage of spare parts. Ingenuity was the order of the day.

CAFATTT - Tanzania

In response to a request from the government of the United Republic of Tanzania, the Canadian government in 1964 authorized a plan of assistance in organizing and training the Tanzanian Defence Forces. This plan for a five-year program included the Canadian Armed Forces Advisory and Training Team Tanzania (CAFATTT) of thirty-three persons. In January 1970 the program was terminated at Tanzanian request.

CAFATTT was composed of two groups, advisory (a two-year accompanied tour by families and located at the headquarters of the Tanzanian People's Defence Forces in Dar-es-Salaam) and training (a one-year unaccompanied tour located at Colito Barracks near Dar-es-Salaam).

The army logistics advisor group included one RCEME major whose duties included planning and procurement of stores and equipment, and the preparation of a transport manual and spare parts accounting forms and procedures. Major D.H. Fraser, the first incumbent, noted that it was a most interesting experience helping to develop a military force[3,4]

1. Goodspeed, LCol D.J.; *The Armed Forces of Canada 1867-1967*; Queen's Printer, Ottawa: 1967; page 256.
2. Mendelsohn, BGen A.; taped interview with the author, 1983; location 93.
3. RCEME Tech Bulletin 11/2, page 41.

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The training group helped to establish and operate a military academy to include basic training, professional advancement and trade courses. The Tanzanian Military Academy included a Vehicle and Technician Company, which had an RCEME captain as OC and two RCEME technicians as instructors. The original incumbents, Captain R.W. Miller, Staff-Sergeant R.E. Willard and Sergeant C.A. Flesch, had a heavy schedule which kept them busy. Their work was complicated by the fact that vehicles differed in manufacture from Canadian Forces models, and that they did not have the type and range of training aids, tools and test equipment, etc., normally found at the RCEME School. Improvisation was the keynote and a great deal was accomplished in a relatively short period of time.

CAFTTG - Ghana

In 1961 the Canadian government approved the appointment of a military adviser to the High Commissioner to Ghana and the provision of the Canadian Armed Forces Training Team Ghana (CAFTTG), consisting of a maximum of thirty officers and men, to assist in the training of the Ghanaian Armed Forces. By the terms of the agreement with Ghana, the members of the team were integrated into the Ghanaian Armed Forces and were entitled to all rights, duties and responsibilities of Ghanian line officers.[5]

In 1966, two positions on the CAFTTG were opened for RCEME officers to help improve the productivity of the Ghanaian Base Workshop in Accra. Major D.V. Hampson and Major J.W. LeLacheur were sent out to become the Control Officer and Production Officer respectively of the workshop. On arriving in Accra, they discovered that the CO of the workshop was a Captain whose only technical training was an X-ray technician course. To avert a potential problem, the two RCEME officers, who were experienced and technically staff-trained, suggested that they be re-assigned to headquarters staff jobs where their skills could be better employed.[6]

Every day life in Ghana was very unhealthy and one really had to take the basics of a two-year food supply with him on a posting to Ghana. It was expensive paying air freight on fresh meat. But not as exciting as living through a coup d'état.[6]

In December 1971 a series of currency devaluations had caused noticeable unrest in the army as privileges were curtailed. "It was almost like pulling the tiger's tail," Major N.A.G. Graham recalled. "You could almost tell it was going to turn around and bite." And it did in the early morning of 13 January 1972. Mud splattered on the shutters of his house at 4:00 A.M. warned him that something was going on. Later, he and his family heard gun fire nearby. As he found out later, his house had been in the direct path of a group attacking the army commander's house in the next block. The mud splattering was the rebels' way of warning him to stay inside.

"The coup was an amazing experience," Major Graham noted.[7] "To see one half of your friends locked up and the other half take over the country was quite unreal and unnerving." Burma Camp, where he worked in the Ministry of Defence, now became the seat of government. Many foreign dignitaries visited and it became quite embarrassing to the Ghanaians to have white officers occupying offices. Hence, the team was phased out soon after.

UNTAG - Namibia

Operational Outline

The United Nations Transition Assistance Group (UNTAG) was created in February 1989 as a military/civilian operation to supervise Namibia's transition to independence.[7] UNTAG included a headquarters, several thousand UN civilian enumerators, military observers and civilian police. Their multi-national security and support included two logistics support units, a Polish service battalion and 89 Canadian Logistics Unit (89CLU).

The first phase of the operation created a stable atmosphere by displaying the military units, (..continued)

4. Fraser, LCol D.H.; taped interview with the author, 1975; location 266.
5. LeLacheur, Maj J.W.; taped interview with the author, 1975; locations 115 and 222.
6. Graham, Maj N.A.; taped interview with the author, 1982; location 10 to 262.
7. DND Backgrounder BG 94.009 (revised), page 4.

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observers and civilian police. There were some interruptions. One lasted for nine days when 1,600 Southwest Africans surged over the northern border from Angola. The second phase was the registration of all eligible voters by the enumerators who worked in teams of three or four scouring the countryside to make up the voters lists. This was done quite peacefully. The elections were held quietly in November. That month, UNTAG started thinning out its units, commencing with 89CLU.

Maintenance Setup

Logistically Namibia was divided into two areas of responsibility. In the south, 89CLU provided second-line supply, transport and backup maintenance support.[8] In the north, the Polish logistics battalion provided supply and transport support while a Swedish maintenance company was to have provided maintenance support. What arrived were German civilian mechanics who had been recruited by the German Government aid and volunteer agencies as an alternative to military duty. Their services were lost to the UNTAG military. So 89CLU had to expand its role to include second-line maintenance back up for the entire country. Its maintenance platoon did not have enough equipment or manpower for this expanded role. Subsequently, contracts were set up with civilian agencies.[9]

The maintenance platoon 89CLU set up with its main workshop in the capital city of Windhoek, and a smaller detachment in the town of Keetmanshoop about 500 kilometres south. The Keetmanshoop workshop was closed in July because of the light workload.

The recovery system set up for the mission followed CF practice of having each unit responsible for all vehicles in its area. 89CLU had its own area and, in addition, was responsible for backup recovery services for all regions.

When 89CLU arrived in Namibia it was originally housed on the fairgrounds in Windhoek. Things operated pretty much on an ad-hoc basis for the first month. Then the maintenance platoon was able to rent a former car dealership building which was well-equipped and had been used by the South African Defence Force's maintainers. It was completely revamped by the platoon's members on a self-help basis.[9]

Throughout the mission, liaison trips were made to observe the maintenance requirements of other units. These proved very successful in nipping potential problems in the bud. It was also a chance for Canadian maintainers to compare procedures with those of other countries.

"2 Service Battalion provided the nucleus of the first rotation," recalled Chief Warrant Officer D.S. Strong, the first RSM of 89CLU. "This meant that we were already a formed team and used to working with each other right from the start."[10] Keeping up this policy, "The second rotation was based on 1 Service Battalion," noted Corporal S. Blackstock.[11]

Maintenance Platoon 89CLU

Captain G.A. Crowe, in charge of the 40-person maintenance platoon of 89CLU, recalled, "We provided first-line maintenance support to our own unit and to other units which lacked this capability, e.g. British signals detachments operating in the northern area of Namibia. We also supported the civil police until civilian maintenance contracts were put in place. Second-line maintenance was provided to all units in need of it. Third-line support was provided when necessary. If it wasn't available through us directly, the contracts cell handled the request. We also did inspections and fleet modification programs such as installation of trailer hitches on over 200 Toyota Landrovers. We also performed scaling for various UNTAG vehicle fleets.

"We had a great variety of vehicles to support. In some cases the general equipments were the same but the models were quite different, e.g. Landrover. Four units used them and each had a different model. For some parts we had to scale four different and unique line items!

"The UN also acquired some vehicles which had been used by the South African Defence Force in the harsh desert conditions of Namibia. The poor condition of these vehicles required extra maintenance support which was coordinated through UNTAG HQ and the maintenance staff. We ordered spare parts and

8. Each military unit was to arrive with a maintenance capability. Within reason, each country did.
9. Phillips, Major L.J.; *Maintenance in Namibia or Friday the Thirteenth part 99*; EME Journal 1/90.
10. Strong, CWO D.; Experiences in Namibia; taped interview with the author, 1992.
11. Blackstock, M/Cpl S.; Experiences in Somalia and Namibia; taped interview with the author, 1995.

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provided a lot of backup second-line support."[12]

Security was a big concern, particularly the risk of riots if election results were unfavourable. "Consequently, we Materials Technicians spent a lot of time putting up security screening on windows of UN buildings," recalled Corporal Blackstock. "This would help prevent breakage and protect those working inside."[11]

SSO Maintenance[9]

As Major L.J. Phillips, the Senior Staff Officer Maintenance, recalled, "The maintenance system in Namibia was a hodge-podge resulting from pre-mission planning, UN restrictive practices and the equipment and technical manpower that actually arrived on the ground. Due to a lack of understanding of the UN system, we groped in the dark for many weeks. We also had to develop a system that was acceptable to all nations and to train our international staff in it. We did get the system in place and running relatively smoothly. It was a challenge that we all enjoyed!"

Mine Protected Vehicles (MPVs). "MPV fleet maintenance presented interesting challenges," he continued. "The first was to find one of the vehicles. They had been taken over from the South African Defence Force and distributed with virtually no hand-over or record keeping. All but one were found fairly quickly. It showed up three months later. It had been sitting in the UN civilian Motor Transport Garage and only when they finally realized they had no use for it, handed it over!"

Twenty-four troop carriers had been leased in two batches from the South West African Police Force (SWAPOL). They were used by the UN Civil Police (CIVPOL). During the election week, the military finally were issued seven troop carriers. Again, the first were taken over without an inspection. The CIVPOL had no mechanics and the vehicles never turned a wheel for weeks even though rental fees were being paid!

The "Wolf" fleet of ten troop carriers was a different story. They were purchased and manufactured in Namibia. A Mini-Project Management team (see below) was set up and the Wolfs were delivered on time with a full maintenance plan in place, including warranty work.

The maintenance plan for the MPV fleet was driven by contract agreements, geography and the UN financial system. For example, the agreement for one type of vehicle stipulated that only three civilian companies could work on it. All vehicles of this type were found in two locations in the far north, and only one of the civilian companies had facilities in the area! The UN financial system limited the funding level which could be approved in theatre. Above this, approval had to be sought from UNNY - another time delay. Separate maintenance and service contracts were set up with one civilian company, each within the local approval limit. Additionally, separate contracts were established for repair parts for these vehicles. When the vehicles required over an hour's work, an estimate was sent by fax to the SSO Maintenance staff who would fax back the reply. Repairs to engines and major assemblies were on a "strip and quote" basis.

Vehicle Inspections. A program of vehicle inspections was set up with Master Warrant Officer R.O. Laaja in charge. His initial work included writing a logistics directive, scheduling the units, forming the team and taking care of the myriad administrative details. Distance was the biggest problem. To inspect 35% of the vehicles of the eight units, the team travelled 5,000 kilometres. An international team of eight vehicle technicians inspected, on average, twenty-one vehicles per day. The inspections were done during the month of September and were thorough, honest, free and fair. Conducted as closely as possible to a Canadian ATI, each CO was debriefed after his unit had been inspected. The results ranged from very good to poor.

Above and Beyond. As often happens on UN operations, tasks come up that must be done and no person specifically trained for the task is available. So the tasks are assigned to someone who "happens to be around at the time." For example, early in the mission there was a problem with gasoline availability. Orders were issued for the establishment of fuel reserves and a bulk POL delivery system to military units. There was a need, however, to establish what products were required, where they were required, what facilities existed and what facilities were required. Captain D. Proulx, a member of the SSO Maintenance staff, was "in the office" when the request was made and was tasked to perform what is normally a supply function. Accompanied by two representatives from the Mobil Oil Company and a supply technician from 89CLU, he toured the country for the next week. His plan met everyone's approval and was soon in place and gasoline flowed to the units. Flexibility and adaptability were the orders of the day!

12. Crowe, Capt G.; *Maint Pl, 89CLU, UNTAG*; article, 1992.

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A Weapons Project. The long-term involvement of the SSO Maintenance staff in this maintenance project was unusual. The Force Commander discovered about 7,000 Heckler and Koch G-3 assault rifles in storage. Most were in deplorable condition, so SSO Maintenance was tasked to set up a project to clean, classify and preserve these weapons. This was done by a platoon of Kenyan riflemen and armourers. An UNMO locked and un-locked the building each day. Major Phillips recalled, "We visited the workshop on a daily basis, spot-checked the results and correlated a four-way tally to ensure all weapons were accounted for. Some interesting occurrences were bullets jammed in the barrel, live rounds jammed in the breach and many home-made field repairs (pistol grips, complete butts, etc.)." Seven weeks later the task was complete.

A Vehicle Engineering Project, the "UNTAG Wolf."[13] The favourite weapon of the terrorists during the various African wars for independence was the land mine which, as a psychological weapon, is completely indiscriminate. Military vehicles, buses, even family cars and large animals will set it off. A vehicle which could protect its cargo in a bush war environment was needed. The "UNTAG Wolf" MPV was the latest in an evolutionary chain to meet that requirement.

In the early 1970s, the Rhodesian Security Forces started running over anti-vehicle mines along the border with Portuguese Mozambique. At the same time, South Africans were experiencing similar problems in Namibia. The Rhodesians, always short of money and materials, adapted Land Rovers and Bedfords by fitting sand bags, water-filled tires and old conveyor belts etc., then switched their efforts to V-hulls. The South Africans, mainly the Defence Research Unit, concentrated on V-hulls.

The next step in the evolutionary design was to minimize damage to the running gear when a mine was detonated. This led to the monocoque concept, basically a V-shaped hull with bolt-on running gear. An explosion could blow away one wheel station, allowing quick and inexpensive repairs.

The UNTAG Wolf was developed in the private sector. Based on the foregoing, the concept was honed by the experience garnered in fighting the South West African People's Organization (PLAN) fighters in Northern Namibia. Its cross-country capabilities exceeded earlier designs. In addition, attention was given to the running gear and ease of repair and maintenance. Battle damage repair was given particular attention. For example, a leaf spring could be rebuilt in the field in no time and a complete axle replaced in as little as two hours.

When the order was placed for the UNTAG Wolf, it had never been previously built. As it was an adaptation of an earlier produced vehicle, there was minimum risk involved. The only areas requiring modification were propeller shaft lengths, leaf springs and air flow through the engine compartment and transmission,

A project management team was used to oversee production. The project manager was the SSO Maintenance, with technical input from the maintenance staff. The user was represented by the United Nations Civilian Police. A member of the procurement section to monitor finances and the contractor's representative rounded out the team. The first UNTAG Wolf was accepted on 8 September, a mere two months after the contracts had been signed.

A Craftsman's Life[10,11,12]

"When we first arrived we were located at the fair grounds in Windhoek," noted Chief Warrant Officer Strong. "Things were done very much on an ad-hoc basis for the first month. Then we moved out on the local economy to various locations in the city."

"Our living accommodation was a ten to fifiteen minute drive from the workshop. It was very crowded, up to six in a room, although we had a roof over our heads," recalled Corporal Blackstock. Captain Crowe noted, "In winter, June to August, we were concerned about the cold. In summer, December to February, the temperature was cool and comfortable. The food was acceptable but not Canadian and took some getting used to. Packages from home with peanut butter and Kraft dinner, things we often take for granted in Canada, were greatly appreciated. The local restaurants had a wide variety of food and it was very good."

"Generally speaking, we were not confined to camp and could walk around freely and go downtown in 'civvies', go to restaurants and watch movies," continued Corporal Blackstock. "There was a public swimming pool in town and, on the weekends, a bunch of us would go down there together and spend the

13. Phillips, Major L.J.; *The White Wolf of Namibia*; EME Journal 1/90.

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day. There was a leave centre set up in Swakopmund on the coast where you could go for a 60-hour leave pass."

"The tour in UNTAG gave every Canadian the opportunity of looking at Canada from a distance," concluded Captain Crowe. "To reflect on Canada and compare the tremendous difficulties in Namibia and other African countries to what we think is threatening, makes our problems seem very small."

MINURSO - Western Sahara

The mandate for the United Nations Mission for the Referendum in Western Sahara (MINURSO) included conducting a referendum on self-determination for the people of Western Sahara, and monitoring a cease-fire and confinement of Moroccan troops and those from the POLISARIO (local resistance) to certain locations. Canada participated from 1991 to 1994, providing military observers as well as movement control and staff personnel.[14] By 1995 the referendum still had not been held.

In August 1991, the first of 350 United Nations personnel began arriving to supervise the terms of the cease-fire and to prepare for the referendum. 180 of them became part of the force headquarters in Laayoune. The remaining 170 were posted as UNMOs to 10 team sites on both sides of the Berm, a Moroccan defensive line stretching over 1,200 kilometres separating the POLISARIO area from the much larger Moroccan-controlled area. UNMOs conducted daily patrols to verify that the cease-fire was being kept, showed the UN flag and built confidence with both parties. Major J.G.M.Y. Pedneault became the team site commander at Zoug in the South-East corner of the country. His team of 19 UNMOs came from 10 nations.[15] A year later, Captain J.P.A. Lamy was posted to Bir Lahlou in the North-East part of the country. He was one of 20 UNMOs from 16 countries.[16]

"Daily routine began at 0800," recalled Captain Lamy, "When a two-Nissan/four-man patrol left to cover an area of from 1,000 to 2,000 square kilometres. The patrol would drive 200-400 kilometres, checking for cease-fire violations and showing the UN flag. All driving was cross-country which was tough on the trucks and hard on the drivers and passengers." Major Pedneault found that he often had to carry out or supervise minor repairs, or recover patrol vehicles on a self-help basis using chains, cable or an A-frame.

"We ate lunch out on the desert and our patrols usually got back around 1700," noted Captain Lamy. "Sometimes we stayed out overnight and slept under the stars. Because of the danger from mines, unexploded ordnance and road accidents, no actual patrolling went on after dark. {We patrolled for six days, with one day set aside for vehicle maintenance, camp maintenance and personal administration. After two weeks of patrolling, we had one week of radio watch and general camp maintenance, and then one week off when we would have a bit of R & R.

At first, patrols used open Land Rovers with PRC25 radios and no Global Positioning System (GPS). After 10 months, Nissan PATROL trucks, good Motorola MICON-XR HF and SPECTRA VHF radios, excellent shower units (built into 20-foot sea containers), and Weatherhaven shelters had all arrived. Up until then, showers were taken using water bottles and a hand basin and everybody lived in tents. As Major Pedneault recalled, "Heat, dust and flies were the main enemies. Getting along with a dozen different nationalities and customs was hard enough. The austere living conditions made it worse."}

Mines were a constant threat. By mid-1992 there had been eight mine incidents but no fatalities, and several vehicles had been written off. Sitting on flak jackets helped, as did putting ballistic blankets on the floor. In the end though, it was simply a matter of hoping for the best and being mine aware. Certain areas such as wadis were prone to being mined, so avoidance was the best course. Both sides provided information on known minefields, but over many years hundreds of thousands of mines had been laid by both sides and had been forgotten, never recorded or moved by constant winds and shifting sand dunes.

"The normal EME trades training or officer training more than covers most of the skills required for this type of operation," Captain Lamy commented. "Since standard NATO radio procedure, CP duties and staff procedures are used by the UN, fitting into the routine is easy. Some things such as identification of

14. DND Backgrounder BG 94.009 (revised), page 4.
15. Pedneault, Maj J.G.M.Y.; *Teamsite Commander Zoug - Western Sahara*; unpublished notes, 1992.
16. Lamy, Capt J.P.A.; *Canadians in the Western Sahara*; unpublished article, 1993.

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mines and ammunition and using the GPS come easily enough in theatre. Would I do it again? In a heartbeat!"

UNAVEM II - Angola

Established in June 1991, the mandate of the United Nations Angola Verification Mission (UNAVEM II) was to verify the cease-fire and demobilization arrangements agreed to by the Angolan Government and UNITA rebel forces. Canada contributed 15 observers. UNITA refused to accept the results of the election of October 1992. By November, the situation was quickly deteriorating. Violence erupted again in January to the extent that UN team sites were evacuated. Canada withdrew its contingent in April 1993.[14]

Major I.F. Somerville was posted to UNAVEM II in June 1992. "After 19 hours of flying and stop-overs, I arrived at Luanda on June 8th," he recalled. "I had been warned that I would be plunging from a 'high-tech' Canadian existence into a 'no-tech' post-16-year-war in Angola. There was no exaggeration. As I arrived, there was a power blackout and I did my customs clearance in the dark!" Five days later, in a remote corner of the airfield, he boarded a Hercules aircraft and with a Malaysian policeman and 20,000 litres of jet fuel, flew east for four hours to Luena, the headquarters of the Eastern Region of UNAVEM. He then boarded a helicopter and flew west for an hour to his outstation at Cuemba. His only contact with the world for the next four months was the UHF radio, the weekly resupply flights and the occasional leave period.[17]

"It was a quiet, routine existence for the four UNMOs in the station. {Activities included weekly weapons checks and patrols to verify that troops were staying in designated assembly areas, meetings with local leaders, and camp chores such as cooking and cleaning up. There was one vehicle and only 1½ kilometres of road. So movement was by foot or by helicopter.} All seemed peaceful. We were respected for being neutral," he noted. "In October, in one great show two days before the election, local officials of the two sides co-hosted a large rally. The election itself was run very smoothly and was a model for civil obedience."[18]

However, UNITA refused to accept the results of the election. "My life in Cuemba was now gone and replaced by 14 to 18 hour days," Major Somerville recalled. "There were violent clashes all across the country and this was occurring just as planned UN post-election reductions were starting. I was transferred to Luena to be operations officer for the region. The headquarters was short of staff so I also became the communications officer and the transportation officer."

"On 10 January 1993, there was fighting in Luena and incoming artillery rounds landed a few metres from the UN compound. It was decided to close down some of the outstations. On the 14th, I went by helicopter to supervise dismantling of an outstation. As the helicopter was landing, confusion among UNITA troops caused a breakdown in control and the soldiers opened fire indiscriminately in all directions. It was a tense five minutes until order was restored and a dangerous situation defused."

"The situation continued to deteriorate. The evacuation of Luena was ordered for January 20th. That morning, a Hercules came into the airport apron with engines running and ramp down. The headquarters staff loaded what they could as fast as possible. But with the sound of artillery near the airport, a crowd of almost one hundred civilians and armed police stormed the plane. The ramp was lifted with most of the crowd on board but leaving some of the staff behind. I stayed back with the helicopter crew, the field force administrator and a Norwegian observer. We loaded the region's radios and some office equipment onto the helicopter, refuelled from a stock of fuel which been kept aside for such an emergency and left 1½ hours later. The flight took over four hours. We supplemented the fuel with jet fuel from barrels on board. On 1 February orders were received to close down the Canadian contingent. A few days later nine of us departed for Mozambique and duty in ONUMOZ."[18]

17. Somerville, Maj I.F.; two letters to the author, 1994; 17 October 1992, pages 1-2.
18. Somerville, op.cit., 12 March 1993, page 1.

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ONUMOZ - Mozambique

The United Nations operation in Mozambique (ONUMOZ) was formed in 1993. Tasks included monitoring de-mining operations, verifying the cease-fire and demobilization of armed forces and supervising elections.[19] The 7,000-man force from over 25 participating countries included five battalions to control movement in Mozambique and 357 military observers (MILOB) to man assembly areas for demobilized troops. Canada initially provided 14 MILOB (9 from its UN mission in Angola and 5 from El Salvador).[20] A year later this contribution was reduced to 4. The mission was concluded in 1995 after elections were successfully held.[20]

"Maputo was a nice surprise after Angola," recalled Major I.F. Somerville. Both he and Major J.G.M.Y. Pedneault worked on the personnel staff at force headquarters. It was a change from their previous UN assignments (see above) and as Major Pedneault noted, "It beat any tour of duty in NDHQ!"[21]

"On my arrival in Mozambique in July 1994," noted Captain J.D. Hersey, a MILOB in central Mozambique, "the region was finishing the demobilization task. In September we began conducting searches for weapon and ammunition caches, and inspected Government munition depots in order to catalogue all munitions within the country. By December, although much had been recovered and turned in, much still required verification or had been destroyed as it was in poor condition."

"The elections were held on 27 and 28 October 1994. We were paired with civilian international election observers. Our task was to observe the election process, offer technical advice if asked and ensure fairness. Polling stations were not well organized. Therefore, the elections required an additional day to ensure that most Mozambicans had a chance to vote. On the first day I suspect that only one-quarter of the people were able to vote. The next two days ran more smoothly. An all-night election count was done on the 29th because the International Election Observers had to leave Mozambique on the 30th. The UN had not planned on the elections taking longer than expected!"

"This meant that the MILOB had to cover-off all the polling sites in which vote counts were not conducted during the night of the 29th. In most polling sites there were no functioning electrical lights, thus counts had to be held during the day. Despite the poor preparation and planning, the elections were fair. Both sides in the conflict accepted the election results and a new president and legislature took office on 9 December."

"When I left Mozambique on 2 January 1995 the country was calm and recovering from the New Year celebration. Only time will tell if true peace and democracy is to come to this nation."[20]

UNITAF - Somalia

"The heat was almost unbearable," recalled Master-Corporal S. Blackstock. "We left Petawawa in winter at -20°C and arrived in Somalia at 43°C. It was like slamming yourself into a wall. We got to Belat Uen just before dark on December 30th, 1992. I went to set up the boundary fences around the Service Commando site. On the 31st, after setting ourselves up in a sleeping arrangement for all round defence, we were given a couple of warm beers to celebrate New Year's. At about 2000 hours we went to ground. That night we could hear Somalis and their goats and donkeys rummaging around the area that we would be taking over. The next day we were asked to take a look at one of the generators at Save the Children."[22]

So began six months of maintaining the Airborne Battle Group's equipment and assisting local communities in the harsh environment of a land ruined and exhausted by years of clan warfare.

Operational Outline.

In the fall of 1992 the multi-national United Task Force (UNITAF) was set up in response to a call by the United Nations Security Council. UNITAF was to ensure that humanitarian relief would be safely

19. DND Backgrounder BG 94.009 (revised), page 8.
20. Hersey, Capt J.D.; letter to the author; 1995.
21. Somerville, op.cit., 12 March 1993, page 6.
22. Blackstock, M/Cpl S.; Experiences in Somalia and Namibia; taped interview, 1991.

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delivered in Somalia. In December, Canada provided the Airborne Regiment Battle Group supported by a National Support Element, HMCS Preserver, and helicopters based in Tanzania and later in Somalia. In June 1993, its task complete, UNITAF was closed down and its troops returned home. A follow-on mission was established to supervise the provision of relief and economic rehabilitation.[23]

Planning and Preparation.

The Canadian Airborne Regiment, in its normal role, was lightly-equipped and organized for fast moving, highly decentralized operations and had a maintenance platoon of 52 all ranks. For its role in Somalia, the regiment was assigned the task of guarding humanitarian assistance convoys and was given AVGPs. A maintenance platoon was organized to operate on a centralized basis and carry out first and second line repairs for the regiment's equipment, and second-line repairs only for the equipment of the squadron of the Royal Canadian Dragoons and 93 Rotary Wing Air Flight.[24]

The harsh climate and terrain expected in Somalia made for some interesting planning problems. Master-Warrant-Officer D. McFarling, the ETQMS of the Airborne Maintenance Platoon recalled, "I had read about the problems with tires in the Gulf War. I hadn't seen the terrain where we would be working, but I had an idea that it would be just as bad. So I ordered 300 extra tires as a special scale to take with us. This was far above normal expected usage. However, the tires we had were designed for temperate weather, high speed, and hard roads and consequently had soft flexible sidewalls. The supply world thought that I was 'losing it.' However, we got the tires before we left for Somalia. As it turned out, the hard thorns found all over Somalia literally 'ate up' sidewalls and we had used all of the tires in three months. Tires were a critical item.[24]

"The foresight shown here helped sustain operations in the early critical part of the mission. It also allowed us time to assess the situation and make a long term plan. As a result of a visit by Lieutenant-Colonel A.W. Price from DGLEM, we got improved tire changing and tire repair equipment[25] and an order for more tires. It was a close thing. Before the second shipment of tires came in, we were down to cannibalizing tires off vehicles awaiting repairs and allowing only one spare tire per guard convoy!"

EME Operations.

In spite of the extreme heat and dust, the operation was a resounding success from an EME perspective. The force deployed with a lean EME organization - a four-person MRT at Joint Force Headquarters, the forty-six person maintenance platoon of the Airborne Regiment (thirty-eight in Belat Huen and eight with the RCD Squadron detached to Matabaan), nine technicians with the National Support Element Somalia and three technicians with 93 Rotary Wing Air Flight. They maintained a wide range of equipment including: Grizzly, Bison, Cougar, HLVW, MLVW and various engineer vehicles, night vision goggles and 81-millimetre mortars.

The battle group patrolled a humanitarian relief sector covering some 2,500 square miles. The pace of maintenance operations was hectic. But what made the tour something between a challenge and a nightmare was scaling and acquiring parts from 1,000 kilometres away with no local contract (the area had been ravaged by clan warfare). In addition, resupply into Belet Uen came via a two-hour Hercules lift from Mogadishu or Nairobi, or by a weekly road move from the national support element in Mogadishu. This road trip was a 300 kilometre, 15-hour, two-day trip because of the primitive road conditions. Despite all of this, the serviceability rate for all types of equipment in-theatre remained at or above 90% throughout the mission. As Master-Warrant-Officer McFarling noted, "We never lost a vehicle on convoy guard duty due to a maintenance problem. Sometimes they would come limping in back from the convoys and they weren't very pretty with all the sand and dust, but everything worked."

The Airborne's Maintenance Platoon was a small group so everybody did everything. "However, some were better at one function than another," recalled Master-Warrant-Officer McFarling. "By the end of the tour, we all were good at everything."

The MRT at Joint Force Headquarters included an FCS technician, two vehicle technicians and an

23. DND Backgrounder BG 94.009 (revised), page 5.

24. Kennedy, Capt S.G.; *Operation Deliverance*; *Journal*, EME Journal 1/94.

25. It was a lesson remembered three years later during preparations for the Maintenance Platoon for UNMIH (see Chapter 9).

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EGS technician. This reflected the heavy emphasis on generators and setting up electric power systems Corporal W.J. Strugnell recalled, "Our equipment dependency was 69 trucks, generators and trailers. Only about ten of the vehicles were steady runners, so we really worked as a small shop rather than as a MRT. Our workshop area was right in front of the headquarters building. We had an MRT vehicle, a tent to live in, a generator trailer and a small parts tent. When we were setting up at the first we were even able to fly the EME flag for a few days![26]

"For the whole tour we worked in the open right beside our tent. However, when emergencies arose we were busy. For example, during one night patrol an AVGP hit a barricade and got 3½ miles of razor wire wrapped around its right rear wheel. The brake lines were torn off and wheel cylinders damaged. We got to work on it right away."[27]

"Operations in Somalia were a rare combination of extreme desert conditions, dust as fine as baking powder and real enemy activity, and so the performance of the equipment in-theatre was vital," noted Captain S.G. Kennedy, the SO EME at Joint Force Headquarters. "Notable successes include the Bison, HLVW, the Global Positioning System (GPS) and the use of JP-5 as a single fuel for aircraft, vehicles and stoves." Master-Warrant-Officer McFarling added, "The eight-wheel Bison MRT vehicle was an excellent piece of gear. It was well-kitted and had everything that we wanted. This was the first time that they had been used in operations. Even the old Fritsche shelters were a great help. We put in the winter liners. This cooled the temperature down several degrees so that we could work in the afternoons. When we were leaving this was important, as we had to inspect all the vehicles in a very short time before starting out on the long journey to Mogadishu."

During the year, six vehicles struck mines and were damaged. Master-Warrant-Officer McFarling recalled, "This was actual operational recovery with the added dimension of risk, something we had always practised but never experienced. The engineers went in and cleared the area, then we went in and dragged the damaged vehicles out. There was a great deal of pride shown when this occurred. First, the recovery crew felt that they had done a good job. Then, as the vehicles were brought into camp the mechanics looked them over trying to figure how to fix them. We were able to repair five. On the sixth, the floor plate below the engine was buckled in too much. We got the suspension repaired, but when we put the engine back in the oil pan rubbed on the bottom plate and would have worn through quite quickly with the vibration."

The battlefield damage repair kits were made by LETE (see page 221). "We received them as we were leaving for Somalia. They were very handy, particularly out with the MRTs with the convoy guards and in fixing up mine-damaged vehicles." Master-Corporal Blackstock added, "The kits came in handy for other uses too. One time we assisted the local community by using the rubber plugs to fill in bullet holes in the water tank at the local hospital!"

Assisting the Local Community.

The Maintainers also helped in the local community. The generator in the Belat Uen hospital had not been working for several months. Many of its parts had been stripped off and the FCS technicians could not get it going. The Canadian Contingent gave the hospital a 20-kilowatt generator which the FCS technicians maintained and repaired as well as the air conditioners and sterilizers in the hospital.

Master-Corporal D.W. Atkinson was given the task of making a daily trip to the hospital to service the generator. On 17 February 1993 he found that he had to change its batteries. A medical operation was in progress so he waited before shutting down the generator. At that moment, a violent demonstration erupted outside the hospital pedestrian and vehicle gates, which were open. A grenade was thrown and shots were fired. He helped an American nurse to get cover inside the hospital. Meanwhile, a Canadian medical assistant, Corporal M. Charette, radioed the camp for assistance. Master-Corporal Atkinson then ordered Corporal M. Charette to guard his back while he closed the vehicle gates. He then had the Somali hospital guards disarmed and closed the pedestrian gates. After briefing the Canadian surgeon in the hospital, he let in the hospital workers and the injured through the pedestrian gate. Then he and Corporal Charette stood guard until the Canadian response team arrived. Medical Assistant Corporal Charette was awarded the Medal of Bravery. Master-Corporal Atkinson was Mentioned In Dispatches.

26. The flag belonged to Major D. Elvish, the G4 Maint in the Joint Force headquarters.
27. Strugnell, Cpl W.J.; taped interview with the author, 1995.

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There were many incidents where the materials technicians were asked to help. For example, the Engineers had repaired a Bailey bridge across a small river to help some local townsfolk. However, the wooden planking used on the floor of the bridge was stolen. The planking was replaced and Master-Corporal Blackstock was sent to weld strapping around the planking so that it would not be stolen again. In another incident, he was asked to repair a 20-foot aluminum boat that had been used as a ferry across a river. However, it was very corroded and after several attempts to weld it, he repaired it with Devcon Aluminum Epoxy.

A Craftsman's Life.

EME Day celebrations in Somalia in 1992 were relatively quiet since the troops were confined to their camps. In Mogadishu, the three EMEs in the MRT were allotted a few extra beers. But in the crowded conditions they were unable to do much more.[27]

The maintenance platoon was allotted a building behind the workshop for living quarters. All ranks lived together. Four corporals, one from each trade, were assigned to clean and set up the area. The building was used for common areas (kitchen, dining room, lounge and shower) and the senior NCMs' and maintenance officer's rooms. The master-corporals and corporals had a tent group outside. "It was a bit crude at first," noted Master-Corporal Blackstock. "We cleaned up all the rocks out back and got rid of the scorpions."

"There was even a laundry machine which two FCS technicians, Sergeant C.H. Smith and Corporal A.K. McPherson, managed to rig up," Master-Corporal J.H. Anders and Corporal K.R. MacDonald both recalled. "They used a garbage can. The agitator was made by fastening a piece of rubber to an AVGP bowser cable arm, which was mounted in a one-inch drill. The speed control was a series of light bulbs hooked up in parallel to control voltage. We didn't have any switches, so you just screwed a bulb in or out to change speed. Later, we got the weapons control panel from a MIG fighter and used the switches in that. It was quite operational looking but we had to watch the speed!"[28,29]

"They did an excellent job," recalled Master-Warrant-Officer McFarling. "They even designed and built a shower. We were the only platoon area with one. I am always impressed by the ingenuity of EME soldiers. They were quite capable of making something out of nothing. Each brought a few ideas from past operations. Bringing it all together like this welded the platoon into a strong unit which always worked at its best."

UNAMIR - Rwanda

Operational Outline

In the summer of 1993 the United Nations (UN) tried to help resolve the conflict between the Government of Rwanda and the Rwandan Patriotic Front in order to ease human suffering in that country. The attempt did not succeed, so in October the United Nations Security Council established the United Nations Assistance Mission for Rwanda (UNAMIR). The death of the Rwandan president soon after led to wide-spread violence, and the UN evacuated most of its personnel. What followed was a catastrophe of human suffering.

In May 1994, UNAMIR was expanded to 5,500 troops. Canada's contribution included 2 Field Ambulance, a detachment from 4 Engineer Support Squadron (4ESR), the 1 Canadian Division Headquarters and Signals Regiment (1CDHSR) and 3 Canadian Support Group (3CSG).[30] The 2 Field Ambulance cared for refugees in northwest Rwanda from July to October. The 4ESR detachment provided water purification and some force facilities engineering from July to September. The 1CDHSR mounted and operated a communications network for the expanded UNAMIR from July to the following January. The 3CSG provided logistical support to Canadian troops. The Canadian role was reduced and changed in mid-1995 to focus on humanitarian assistance. Support for this was provided by 95 Canadian Support Group.

28. Anders, M/Cpl J.H. and MacDonald, Cpl K.R.; taped interview with the author, 1995.
29. Atkinson, M/Cpl D.W.; telephone interview with CWO A.E. Rest, 1995.
30. Department of National Defence Backgrounder, BG-94.008 (Revised); January 1995.

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3 Canadian Support Group

In the initial stages of the deployment of the expanded UNAMIR, 3CSG was the only support organization available so it supported all UN troops. Arriving in mid-July, the unit was located in the Kigali industrial park. One of its tasks was consolidating UN equipment, which was scattered throughout the city. Corporal S. Muirhead recalled recovering a Russian BTR-80. "It was an uneasy time," he noted, "as tensions between the two sides were very high. We lived in the stadium. Up until we arrived it had been crammed with 15,000 refugees, and some were still there as we got on the ground. We stood guard at night wearing flak jackets and helmets and carrying C7s. By day I also serviced Canadian vehicles and helped load trucks with UN supplies."[31]

Maintenance Troop 1CDHSR

Warrant Officer B. Fleming of the maintenance troop arrived in Kigali on 17 July 1993 with the regiment's advance party. When he got to the stadium, which was to be the regiment's home for the next six months, he found 50 vehicles that had been abandoned by the earlier UN group when it was evacuated. He didn't have many tools, but before the end of the day he had 20 of them going - a personal vehicle for each member of the advance party with the compliments of "EME in Africa!"[32]

"For a week and a half after we arrived in mid-August the regiment didn't have any vehicles or equipment," noted Captain J.W. Mutrey. "Priority had been given to moving the equipment of 2 Field Ambulance, so ours waited. We spent the time cleaning up our living accommodation and setting up our work areas."[33]

During this period, the maintenance troop had to borrow recovery equipment. "Six days after we arrived, a 1CDHSR HLVW with water purification kit went out to a lake in Southwest Rwanda, got too close and became stuck," recalled Master-Corporal R. Roberts. "We borrowed two Isuzu 3-ton trucks and went out to the lake to recover the vehicle, but they wouldn't even budge it. So we went to an American civilian recovery company and borrowed their M578 at 9 o'clock in the evening. We went through 11 check points getting back to the lake that evening. Captain Mutrey led the way and managed to negotiate our clearance through each one. Perhaps the roadblock guards were fascinated with our huge tracked vehicle! After recovering the HLVW, we were back in camp by four in the morning."

The 1CDHSR had 1¼-ton and MLVW radio vans and generators for its nine signal detachments. It also had some MLVWs, HLVWs, Kenworths and fork lifts for command and support. The defensive platoon was supplied by the Canadian Airborne Regiment and had seven Grizzly AVGPs. To support this equipment, the Regiment had a 23-member maintenance platoon organized into recovery and eight MRTs (covering all EME trades and the EGS trade).

Organization. The ancillary technicians worked out of the stadium in the sports complex in Kigali where the troop's living accommodation was located. Seven kilometres away, the vehicle technicians had five covered bays in an old transportation compound in the Kagali industrial park. Four of the bays had pits, but the sides were weak so no jacks could be used. There was a large gravelled work area with a room for tools that could be locked up at night. There was also a canteen, POL storage and control office area. The tire truck was set up in the work area.

Operations. The nine signals detachments were spread all across Rwanda and were supported by MRTs from Kigali for in-situ servicing and first-line repair of equipment, composed mainly of vehicles and generators, so a monthly servicing schedule was set up. "Consequently, the maintainers were on the road a lot just getting to and from their taskings. The farthest distance was six hours," recalled Master-Corporal Roberts. "But that was through mountains and, although the roads were not too bad, they were narrow and there were a lot of refugees along the way and this slowed us down trying not to hit them."

"At the beginning of our tour we also encountered many roadblocks," noted Corporal J.A. Geddes. "Every two kilometres or so, we would be stopped by soldiers armed with semi-automatic weapons." Later on, the road blocks disappeared, except at the edge of the city.

Recovery tasks to the outposts were long and difficult. The recovery crews on one task got to do an

31. Muirhead, Cpl S.; Experiences in Rwanda with 3CSG 1994; letter to the author, 1995.
32. Mutrey, Capt J.W.: *EME in Rwanda*; EME Journal 2/95.
33. Members of Maint Tp 1CSR; Experiences in Rwanda 1994-95; taped interview, 1995.

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extra recovery job along the way and saved the lives of two of the UN relief workers. Acting-Master-Corporal C.J. Trepannier and Master-Corporal R.B. Noseworthy had been tasked to recover a Grizzly which had burnt all of its brakes on a steep hill near Cyangugu, in the far southwestern corner of the country. The recovery team was accompanied by Master-Corporal Roberts and Corporal M.W. McNeill in an HLVW MRT vehicle. After seven hours driving, the group was near its destination when it was stopped at the top of yet another steep hill. They were told that a few minutes before a UNHCR vehicle has lost its brakes on the hill and had overturned at the bottom. Two injured people were still inside.

Proceeding to the bottom of the hill, the Canadians crews assessed the situation. At that moment, a truck came down the hill, lost its brakes and, fortunately, skidded into the Canadian wrecker instead of the overturned truck. The MRT crew returned to the top of the hill to stop further traffic and radioed for a medical evacuation helicopter.

Meanwhile, the recovery crew hooked up the disabled truck for enough vertical lift so that the two trapped crew members could be released. One was quickly freed. Then, although the lift was at the limits of the HLVW recovery vehicle's crane, Master-Corporal Noseworthy crawled under the overturned vehicle as it was slowly inched up a bit, and freed the remaining crew member. Soon both injured people were on their way to the hospital via helicopter. In a letter to Captain Mutrey, they later thanked the Canadians for saving their lives.[34] The Canadians continued on, knowing that they had really helped. To them it made the whole tour worthwhile. All four were awarded Chief of the Defence Staff Commendations.

"When the Grizzlies for the Airborne platoon arrived, we found that all of the 50-calibre machine guns and many of the C6s that were sent had ground mounts. It was quite a project getting that sorted out," recalled Corporal M. Burton, the weapons technician. "After that, I spent most of my time maintaining the propane system and stoves on the kitchen trailer." The FCS technician, Corporal R.G. Burns, spent all of his time setting up camp wiring and maintaining generators. "I teamed up with the EGS technician in the EGS MRT and also worked on electrical equipment maintenance."

"The troop's welding trailer was not sent and I had no oxy-acetylene equipment for the first four months, so there was very little that I could do," noted Corporal S.J. Wolf. "We requested a diesel-operated welder from Canada. When it arrived, it was without accessories and there weren't any available locally to make it work. At the end of October I spray-painted a dozen MLVWs which had been left by 2 Field Ambulance and were still painted camouflage green, and had to be painted UN white."

A Craftsman's Life. "We lived 20 per room in what had been offices in the stadium," recalled Corporal Trepannier. "Each person had an 8 by 9 foot bed space. We had mosquito netting over. It was like the barracks in basic training all over again!" Corporal Geddes noted that there were other females in the regiment and she lived in a room with them. "It was like a giant fishbowl!" she added. Initially, everybody was on hard rations. Then in September fresh rations became available.

Everybody was entitled to three 72-hour passes during the tour. An old convent was fixed up as a rest and relaxation area with movies and a swimming pool. Some went to Nairobi, Kenya but that was a $600 trip. Most took their two-week UN assisted leave in Canada.

As usual, the Canadians were active in helping the local community. There were many orphanages adopted by the Canadians. Nearly everyone spent leisure time helping out. For example, Sergeant J.G.B. Girouard, Warrant Officer Fleming, Captain Mutrey and Corporal W.S. Cyrus went to a small town and repaired a small two-cylinder Better diesel engine which was used by the community to grind grain. There were no parts available. So they spent four consecutive Sundays stripping it down and getting it going. The satisfaction came from the appreciation of the people.

95 Forward Logistics Support Group

After the departure of the 1CDHSR, support for the Canadians in Rwanda was provided by 95 Forward Logistics Support Group. The unit's 95 personnel included 19 vehicle technicians. They worked along side other nations' maintainers and used the covered work areas that had been used by previous contingents. Light civilian-pattern vehicles were repaired in one area and the heavier vehicles in another. The technicians lived in an old driver school near their work area. The Group even had a mascot, a small monkey!

"EME Day was a fun day," recalled Master-Corporal J. Falardeau. "We invited the RAEME

34. Dillon, Stephen; letter to Captain Mutrey, 1994.

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Craftsmen and had several sporting events, a nail driving competition and horse shoes, etc. We enjoyed the opportunity of exchanging stories, badges and sweaters."[35]

"Perhaps the greatest satisfaction was being able to directly participate at our level in community projects. For example, on one occasion Corporal K. Dawe and myself built a swing for an orphanage. That was just one of many similar projects in which members of the Group were able to participate. We felt that it made a difference." At another school, "You could see the children ready to pounce on the jungle gym as it was being completed," recalled Sergeant D.A. Pike. "That was thanks enough. These swings and jungle gyms were very popular. The first ones were built of wood, but later metal was used as it weathered better and could withstand a heavier overload."

On a larger scale, the Group cleaned up the roadsides around Kigali. This involved both heavy recovery vehicles. The crews recovered many disabled vehicles and heavy items, such as water tanks that littered the area, and brought them back to a central area.[36]

35. Falardeau, M/Cpl J.; taped interview with the author, 1995.
36. Demers, Sgt J.P.J. and Pike, Sgt D.A.; conversation with the author, 1995.

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Chapter 9 - CENTRAL AMERICA

ONUCA - Central America, UNMIH - Haiti

ONUCA - Central America

The United Nations Observer Group in Central America (ONUCA) was created at the request of five Central American governments to establish an observer force in their region. After the Nicaraguan election in early 1990, ONUCA assisted in the demobilization of resistance forces and the destruction of their weapons. This operation was successful but was hampered by serious deficiencies in logistics and communications support provided by the UN.[1]

Canada contributed observers and a helicopter squadron, 427 Tactical Helicopter Squadron, for one year. The commanding officer, Colonel E.A. Findley, decided to take all of his vehicles. "It was fortunate that we did," he later recalled, "because during the demobilization there was a major reorganization of observers and a requirement to move many of them. The only vehicles available to the UN were my squadron's vehicles. Our two vehicle mechanics suddenly became very important."[2]

"We worked over the Christmas break getting all the vehicles inspected, painted and ready to go," noted Sergeant R.F. Kendrick, who was in charge of the squadron's three vehicle technicians. "Master-Corporal R. Landry and an augmentee from 450 Squadron went on the first rotation. I and Master-Corporal B. Murphy went on the second. The vehicles were only used occasionally ... to meet resupply planes and to move truce observers."

"We were a small, two-person, first-line unit supporting 17 vehicles including 5 MLVWs. In Canada we would have depended on a lot of support from other EME units on base. In Honduras we didn't have that. So it was frustrating. We didn't have much to start with. The facilities were bad and there was a lot of stealing by the local people. At first the resupply flights were every week, but soon they were only every three weeks. Our supply group had trouble getting the parts we needed. There were a lot of errors made back home in ordering parts. It seems that they didn't understand our priorities or what equipment we had. For example, we had some gas 1¼-ton trucks and were scaled for them. When we needed another we were sent a diesel! We had no parts for it so it was never used."[3]

Initially, the vehicle technicians didn't have an MRT vehicle and there wasn't any hard standing or shelter for working. "But by the second rotation we had things pretty well established," Sergeant Kendrick continued. "The UN bought us a Toyota Landrover for an MRT vehicle. A concrete foundation had been laid down and we got a small one-vehicle shelter set up. We were able to get downtown and buy some tools. We used a couple of Paul Bunyons for storage of parts and tools. You had to lock up everything at night. At first we were bivouacked on the airfield in tents. Later we were moved off-base 10-15 kilometres and lived in villas. Although we had fresh rations, it was cheaper to eat in restaurants than to do your own cooking. The price of canned goods in the malls was more expensive than in Canada.

"This was a very frustrating operation compared to other UN missions," he concluded. "We were a very small first-line operation and were not really set up for long-term independent, isolated operations with few tools and parts, infrequent resupply flights and the need for good 24-hour security arrangements."[3]

It was a lesson remembered for Haiti.

UNMIH - Haiti

1. MacKenzie, MGen L.; *Peacekeeper - the Road to Sarajevo*; Douglas & McIntyre, Vancouver / Toronto, 1993; page 84.
2. Col E.A. Findley ; taped interview with the author, 1993.
3. Kendrick, Sgt R.F.; *Experiences in UNIFIL and ONUCA*; taped interview with the author, 1995.

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Operational Outline. The United Nations Security Council authorized the establishment of The United Nations Mission in Haiti (UNMIH) on 23 September 1993. However, continuing troubles, violence and intimidation prevented the UN from really carrying out its mission. In May 1994, the Security Council authorized a multi-national force to take all means necessary to secure peace.[4]

Canada contributed a contingency support wing which included a tactical helicopter squadron, an airfield engineer squadron, a medium transport flight and a national support squadron that included a maintenance platoon responsible for repair of all land-based equipment.[5]

Planning and Preparation. Air Command was tasked to plan and prepare the Canadian contingent, CCUNMIH. The first plan was for a contingent of 600 all ranks, including a maintenance platoon of 40. (In the end, 500 all ranks with a 28-person maintenance platoon were sent.) Planners experienced the usual difficulties. The maintenance platoon was not 'standard' and was built from scratch as tables of organization and establishment were constantly changing.

Personnel for CCUNMIH came from Air Command. Hence the list of home bases of the Maintainers reads like a trip across Canada; Edmonton, Cold Lake, Moose Jaw, Winnipeg, North Bay, Trenton, Ottawa, Greenwood and Goose Bay. However, thanks to the EME esprit de corps and common training, they soon became a team.

In October 1994 the contingent was brought to CFB Saint-Jean for training, final preparation and cultural briefings. After training was completed, the contingent's vehicles started to arrive. Many were in rough shape and the maintenance platoon was kept busy repairing and painting them UN white. Then the contingent's equipment was put on a ship which set sail from the port at Bécancour, Québec while the personnel flew to Port-au-Prince in the month of March.

EME Operations. The 28-person maintenance platoon was responsible for a mixed bag of 300 vehicles, including Iltis, 1¼-ton trucks, MLVW, HLVW, old 5-tonners and a large number of civilian pattern and heavy engineer equipment. As Master-Corporal R. Pettit noted, "The tour was a very busy one, but as maintainers we would not have had it any other way."[5]

The platoon had its workshop in the south-east corner of the Canadian camp (CANARGUS), located in one of three hangers on the aircraft ramp situated beside the main supply route. It was a concrete building with concrete floor and steel-sheet roof which provided good protection from the elements. "It was usually 3-5 degrees cooler inside than outside the building," noted Captain E.D. Fraser. "We set up a line of sea containers on the ramp in front of our hanger. This cordoned off helicopter traffic and sheltered us from rotor wash and noise! We also used these sea containers to store spare parts."[6]

Maintenance Platoon UNMIH was set up as a centralized workshop where 90% of all repairs were carried out. UNMIH had two engineer flights which often deployed to the countryside to help in repairing roads, buildings etc. "On these occasions we supported them by sending an MRT to do first-line repairs in-situ," recalled Master Warrant Officer J.E. Baird, the platoon's ET. "Local contracting was mainly parts procurement for the CCUNMIH vehicles. The purchase of parts and services for North American vehicles was always interesting and often difficult because of the embargo and a market that dealt mainly with European and Asian type vehicles." The platoon's tire-changing SEV was the only tire-changing facility in UNMIH. Its inclusion in the platoon's equipment was a legacy from Somalia (see page 119). The Canadians were able to help other contingents in the Mission.

Community Assistance. Off-base tasks gave the maintainers the opportunity to work with peacekeepers from other nations. An example is the Thiotte water project, which provided water to a remote community of more than 20,000 Haitians in the south-east of Haiti near the Dominican Republic border. This was a task of the 3rd Special Forces Group (Airborne), United States Army. Welding support and equipment repair was provided by Corporals T.D. Caughey and K.R. MacDonald. As a result of their work the maintenance platoon was given a special certificate of appreciation by the 3rd Special Forces Group. Of special note is that the Canadians had "willingly" provided assistance "when other organizations had not been forthcoming."[7]

4. DND Backgrounder, BG 94.011, page 2.
5. Pettit, Cpl R.; *Maintenance Platoon CCUNMIH, Port au Prince, Haiti*; unpublished article, 1995; page 1.
6. Fraser, Capt E.D.; Notes on CCUNMIH; 1995.
7. Wollam, Capt P.F. (USA) to Fraser, Capt E.D.; letter and certificate of Appreciation; 1995.

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Another project required welding U-shaped brackets to water-pipe couplings. The pipe, bridging a deep ravine, had been knocked down during a storm two years earlier and there had been no welding equipment made available until the Canadians arrived. The maintainers' efforts allowed the water-pipe to be reassembled, bringing water to 15,000 people. In another project a section from the airfield engineer squadron was sent to a village to build a school. While they waited for material, section personnel assisted in several other community assistance projects, such as building a bridge and clearing a floodway. Corporal D.D. Miller - who had been attached to maintain the section's vehicles - helped clean up and reseal several well pumps. With the wells working again, the village women no longer had to walk many kilometres for water.[8]

A Craftsman's Life. Living accommodation was in the south-west corner of CANARGUS, on either side of the supply warehouse (Building 13). The platoon's corporals lived in "Possum Lodge" at the west end of Building 13 along with the corporals from supply and transportation. The master-corporals lived in a tent group beside the building. On the other side was "Menopause Manor" - the sergeants' tent group. "The production warrant officer and the ET spent most of their time at the Gazebo," noted Captain Fraser, "while I lived in the east end of Building 13 with other junior officers from the contingent."

EME Birthday. Canada's Craftsmen are well-known for taking their Corps birthday everywhere they go and 1995 in Haiti was no exception. The day started out with the majority of the maintenance platoon boarding a bus and driving about 1½ hours north up the coast to a resort that the UN had declared safe and secure. "Once there they hit the beach like a wild hoard," recalled Master-Corporal Pettit, "embarking on a day of beach volleyball and major amounts of time splashing in the waves. Late in the afternoon everyone returned to camp for a barbecue of burgers, steaks and pork chops. We were able to scrounge all the meat from a nearby American Special Forces camp. All we had to do was to fix some tires for them. The NCOs and Captain Fraser bought the rest of the goodies, real potatoes and our beer ration of two cans per person per day. It was the first-ever EME birthday in Haiti!"[9]

8. MacDonald, Cpl K.R. and Miller, Cpl D.D.; taped interview with the author, 1995.
9. Pettit, Cpl R.; *CCUNMIH Maintenance Platoon EME Day Celebration*; unpublished article, 1995.

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Chapter 10 - THE MIDDLE EAST

UNEF1 - The Gaza Strip, UNFICYP - Cyprus,
UNEF2 - Camp Chams and Ismailia, UNIFIL - Lebanon,
UNDOF - The Golan, MFO - The Sinai, UNIIMOG - Iran/Iraq,
The Gulf War, UNIKOM - Kuwait

When HMCS Magnificent sailed from Halifax on 29 December 1956, 56 Canadian Infantry Workshop RCEME began to function as the workshop for the first United Nations Emergency Force (UNEF1).[1] *Canada's Craftsmen had begun a proud record as maintainers for UN peacekeepers - a record which continues today - forty years later.*

UNEF1 - The Gaza Strip

Operations Outline

War broke out between Israel and Egypt on 29 October 1956. Four days later Lester B. Pearson, Canada's Secretary of State for External Affairs and Representative to the United Nations, proposed to the United Nations General Assembly that a multinational military force be created and dispatched to the Middle East for the purpose of keeping the peace. On 7 November 1956 the General Assembly agreed to create the United Nations Emergency Force. Ten countries, Brazil, Canada, Columbia, Denmark, Finland, India, Indonesia, Norway, Sweden and Yugoslavia, were requested to contribute troops to the force. All but three, Columbia, Finland and Indonesia, served throughout the full time the force was in being.

The role of UNEF1 was to supervise the orderly withdrawal of British, French and Israeli troops from Egypt to the agreed Armistice Demarcation Line (ADL) and the International Frontier (IF) and then supervise the truce between Israel and Egypt. The second phase consisted of patrolling the ADL and IF to prevent incidents between the Israeli and Egyptian forces or civilians which could "brew up" into a full-scale war.

By the end of December 1956, the Anglo-French forces had retired from the theatre and the gradual withdrawal of the Israelis across the Sinai had started. This resulted in the UNEF1 contingents being committed to their tasks as soon as they arrived. All but the Yugoslavs had been flown to Egypt and consequently the majority of the force had very little equipment. On the night of 6 March 1957, UNEF1 units completed their deployment along the ADL between the Gaza Strip and Israel and along the IF between Egypt and Israel through the Sinai. They also occupied Sharm El Sheik, 400 kilometres south at the tip of the Sinai peninsula.[2] The force deployed four infantry battalions in the Gaza Strip along the ADL, two reconnaissance squadrons (one Canadian and one Yugoslav) along the 200-kilometre IF, and an infantry platoon at Sharm El Sheik.

During the nearly eleven years that the force was in being, it went through many reorganizations and re-assessments in an effort to reduce costs without depreciating efficiency. Equipment was changed, new procedures adopted and new techniques tried in order to reduce the manpower requirement. Efforts were also made to standardize equipment and supplies.

The demise of UNEF1 came quickly on 18 May 1967 and without adequate warning. The force did manage to get out of the area, but not without casualties and many anxious moments, as Egypt decided to take over the line and occupy the UN positions along the ADL.

The RCEME Role

1. Tait, Maj S.G.; *RCEME in the UNEF*; Canadian Army Journal, issue 12/1, January 1958, pages 133-139.
2. Dare, Col M.B.; *The Canadian Army Contingent--UNEF*; *Snowy Owl*, Canadian Army Staff College, 1957, pages 26-30.

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Canada's plan to mount its contribution to the UNEF1 was given the code name "Rapid Step". The initial intention was that Canada, like several other countries, would provide an infantry battalion group composed of an infantry battalion, an engineer troop and an appropriate service support element. The RCEME support for this group was to comprise about 20 men, half for unit repairs and the other half for field repair work. The main body of the group was to be dispatched on the aircraft carrier HMCS Magnificent while the advance party was to be flown to Egypt by the RCAF.

A RCEME advance party of ten other ranks under the command of Captain G.L. O'Brien departed Canada by RCAF aircraft on 22 November 1956 to rendezvous with the remainder of the contingent's advance party in Naples. Two days later they proceeded to Abu Suweir near Ismailia, Egypt. The next day, as a consequence of Egypt's refusal to accept a Canadian infantry battalion, the Commander UNEF1 ordered the Commander of Canadian Base Units Middle East (CBUME) to establish an administrative base at Abu Suweir to support the entire UNEF1.

The infantry battalion was deleted from the Canadian contribution and the service support organization which had originally been intended to support a battalion group was expanded to one that could support a multinational force of more than 6,000. The RCEME contribution was provided by 56 Canadian Infantry Workshop RCEME. This was not a standard infantry workshop but was specially structured to provide first and second line support to all units of the Force.

Setting up Shop

A flurry of activity followed this major change in Canada's role. The code name Rapid Step became prophetic because the "Maggie" was to sail in a month. Men and equipment were rapidly brought together. The RCEME units most directly involved were 202 Base Workshop, 41 Infantry Workshop, 17 Company RCEME and 6 Company RCEME. 17 Company was involved in a crash program to prepare vehicles for the force while 6 Company in turn prepared the vehicles for shipment and assisted with the loading of the Magnificent.

On 29 December 1956 the "Maggie" left Halifax with, among others, 56 Canadian Infantry Workshop aboard. Because of the haste with which the workshop had been put together, Major S.G. Tait - the CO - wrote, "We first met our personnel and saw our stores on board. It was necessary to start from scratch as soon as they got their 'sea legs' to establish an orderly room, and to prepare nominal roles, duty rosters and the multitude of small details which go to form daily unit routines. While some workshop personnel checked the vehicles and exercised the engines every other day as a precaution against the penetrating salt spray, others assisted members of the ship's crew with technical repairs or chipped paint and scrubbed decks."[1]

The workshop disembarked at Port Said on 11 January 1957. While a rear party under Captain G.D. Savage remained behind to unload vehicles, the main body moved on to Abu Suweir to get established. This former Royal Air Force camp, ten miles west of Ismailia, was in dreadful condition because of the recent fighting. Despite the problems this presented, the workshop was set up in a ten-stall garage, several hut type out-buildings and a portion of a hangar. Four days later the workshop vehicles arrived from Port Said and work began on an already sizeable backlog. But it was not until the 25th, another ten days later, that spare parts and stores were available. And it was a further six weeks until the spare parts section was able to procure bins. This really slowed down the storemen's efforts. Although they had a six-month supply of parts and expendables they were continually delving into boxes to try and satisfy the workshop's demands.[1]

Ingenuity was the only commodity not in short supply for those ten days. Vehicle repairs to UNEF1 vehicles were carried out with six to ten men sharing tools. Fuel-pump diaphragms from plastic tablecloths, oil seals from shoe leather, small valves from non-serviceable big valves and too-small bearings fitted with collars to increase the outside diameter were some of the expedients successfully used.

The camp at Abu Suweir was blacked out at night and all troops had to be in their compounds by 2200 hours. Travel outside the camp was sometimes difficult. To pass through the Egyptian or Israeli lines at any time required prior clearance from both sides and notification to the United Nations Military Observer concerned. There was good reason to believe that it was a risky business to be on the roads after dark since it was known that road blocks were liable to be manned by sentries who would shoot first - then challenge!

After the deployment of the peacekeeping forces was completed, the lines of communication

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between the patrols on the ADL and IF and the administrative base near the Suez canal were too long. The initial intention was to move the base from Abu Suweir to El Arish. However, Rafah - a former British Royal Army Ordnance Corps depot in the Gaza Strip - offered a better location in that it was much closer to the troops being supported.

Though better situated than El Arish, Rafah had some distinct disadvantages. The permanent buildings had been severely damaged by the war. The building allotted to the workshop had once been a tank shop but, as Major Tait noted, "When we arrived it was well ventilated - not one window or door remained! Water and power facilities were long gone. Once again we had to repair buildings, build showers, level ground and install power."

Workshop Glimpses

Ten national contingents in one force and under one command was something new. In addition, they were well spread out from the Suez Canal to the Israeli border and from the Mediterranean to the tip of the Sinai Peninsula. The task of 56 Canadian Infantry Workshop was to provide first and second level support to all units/contingents of the Force. Only the Canadian Reconnaissance Squadron and the Yugoslav Reconnaissance Battalion had an LAD. The remainder had one or two ex-civilian mechanics or men who were "handy" with tools.

The workshop's sections included light and heavy vehicles, tire, body, welding and radiator, textile, carpenter, component, telecommunications (tels), small arms, instrument, battery, R&I section and a control office.[3] Due to the variety of equipment sizes, types and countries of origin there were many exceptions to normal practice in the operation of the workshop. Captain A.S. Etter noted in 1960, "The tels shop worked on record players, juke boxes, etc in addition to a miscellaneous collection of radio receivers and transmitters. A list of makes, models and countries of origin of electronic equipment reads like the inventory of an international second-hand store!"[3]

"There were over 300 electrical power generators in UNEF1, " observed Staff-Sergeant T.W. Baldwin, "ranging in size from 1 to 18 KVA and representing 52 makes, models, types and countries of origin." This workload was controlled centrally in order to provide faster and more efficient service. The six-man shop carried out about 1,500 electrical repairs per year.

Fifty per cent of the electrical work was for automotive components. An electrical mechanic allotted to the vehicle section diagnosed faults on the vehicles. Faulty components were tagged, sent to stores and later to the electrical section in batches for repair by vehicle mechanics attached to that section. This arrangement had the added value of trades training for both trades.

By 1960 many repairs to the workshop building had been completed. The CO, Major B. Yarymowich, reported "The interior had been completely whitewashed, which not only doubled the light available, but made working conditions more pleasant. The offices, telecommunication and instrument shops had been painted and the instrument shop was air-conditioned." The machine tools had been dismounted from the machinery lorries brought over in 1956, and had been installed in the workshop building. Repairs were carried on inside the workshop or out on the apron in the good weather.[4]

The supply of parts, he also noted, had improved tremendously from the early days. To improve the situation even more, a RCEME sergeant was attached to RCOC spare parts section to assist in interpreting scales and reviewing stock levels, as well as to give advice on workshop experience in parts usage and failure.

By 1960 the force was settling down to a routine. There was less movement, which meant less vehicle usage. Consequently, men became available to repair and rebuild minor assemblies and components. Originally this had been done in order to get assemblies that were in short supply for use in the shop. Now it was continued partly for trades training, partly for efficiency, and partly because available contractors were as far away as Alexandria.[5]

Emphasis was placed on educating units to maintain their vehicles and keep them in good repair. A liaison and inspection section was established with two teams each responsible for certain units. They inspected every vehicle in the force quarterly, informed units of the condition of vehicles, assisted by per-

3. RCEME Technical Bulletin 6/1, pages 1-4.
4. Yarymowich, LCol B.; *Tradesmen for Peace*; Canadian Army Journal, issue Fall 1960; pages 134-138.
5. RCEME Technical Bulletin 12/3, pages 3-6.

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forming minor repairs and giving advice on procedures and techniques. The teams had specially modified shop-van trucks. These inspection and liaison teams brought fulltime professional expertise forward to national contingents. These contingents were not always composed of fulltime professional soldiers. Often they had equipment with "different bolts and different volts" and had to operate their equipment in searing daytime temperatures, cold evenings and on rough patrol roads. Sand, of course, was everywhere - in the gas, in the instruments and in the hair.

The travelling inspection teams were exposed to a variety of national customs, religions, diets, dishes, drinks, working methods and operating procedures all of which helped to prevent the daily routine from becoming too monotonous. As Lieutenant E. Conway noted in 1960, the questions were always interesting e.g. "Would you please inspect our vehicles because we would like to get some new ones" and "Could you please paint the CO's fridge? We have it all ready but the Bedouins stole our paint gun last night."

By 1961 the trucks originally brought to Egypt by the national contingents of 1956-57 were largely worn out. To replace them from the original countries would have been uneconomical. A more satisfactory arrangement was the purchase of a standard series of chassis which were shipped to Middle East ports. The required special bodies were then built and mounted by local manufacturers. In some cases it is estimated that the overall cost was reduced by as much as two-thirds.

"The workshop," Captain W.H. Norton noted, "was called upon to assist in the preparation of vehicle specifications and also to act as advisers to the staff in the review of the technical aspects of requesting and selecting contractors' bids." When contracts were let, RCEME acted as the inspection agency for UNEF1. In one case two new 32-passenger buses were completed by a contractor in Beirut, Lebanon by December 1961. Final inspection and handover was made by Warrant Officer (Class 1) A.C. Brunton. Delivery was scheduled for New Year's Day. However, the ten-hour road trip was delayed for two days because of an attempted coup d'etat against the Central Lebanese Government involving troops of the Tyre garrison which was located on the proposed homeward route.

Recovery constituted a problem for three reasons. The first was that the workshop had only one recovery vehicle. It was an M62 which had been brought over on the "Maggie." (The only other recovery vehicle in UNEF1 was held by the Yugoslav reconnaissance battalion.) The second reason was the mines and minefields which took their toll of vehicles and lives with the added danger of losing the workshop's only recovery vehicle. The third reason was that recovery in Egypt was measured in time rather than mileage due to the rough terrain and lack of roads. Recovery jobs often took three to five days, covering distances of 800 to 1,000 miles over desert tracks where dust lay road-level in the deep pot-holes. During long recovery jobs, food, water and fuel for the return journey had to be carried in a second vehicle.[1]

By 1960, mine-free trails had been marked in many of the minefields and drivers had become more skilled in traversing the terrain. Consequently recovery calls became rare. However, there was the occasional unusual recovery call. In early 1962 a railway flat car was derailed by a broken wheel housing. The scene of the derailment was about three miles from Camp Rafah. The derailed flat car was holding up railway traffic and had to be removed from the tracks as soon as possible. The crew and wrecker were dispatched to the scene. A winch cable was fixed to the flat car and the wrecker winched the car off the tracks. The flat car was now on its back like a stranded turtle and clear of the right of way. The railway was once more in business.

A Craftsman's Life

56 Infantry Workshop operated some unconventional items and services - sometimes in unconventional ways, too. And yet it managed to produce almost anything, from a piano tuner to a lock-smith or from a darts team to a very capable softball team. Warrant Officer (Class 2) J.M. Cunningham reported in 1961, "If variety was the spice of life, there was plenty of spice in Egypt! The unit's body shop became a movie theatre in the evenings while unit technicians operated and maintained the camp's ice-making plant, producing half a ton of ice per day. Consequently Warrant Officer Cunningham's position was named Ice Artificer!"

The unit made a strong effort to up-grade eligible tradesmen; their own as well as those from other units. Each year after a regimental refresher course, Group 2 vehicle mechanics were put on a planned programme of on-job training and lectures to try to bring them all up to Group 3 level. Out of 75 craftsmen

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in the workshop in 1960, 33 were Group 2 and required upgrading. Since there was a large variety of equipment available, the opportunity for training was excellent and proved to be a tremendous morale booster.[4] Not to be outdone, an anonymous scribe of the early 1960s also noted that a UNEF1 tour was an ideal time to study for the officer promotion examinations!

The workshop ran a chess school. The Canadian Contingent chess champs of 1966/67 were Craftsman Lortie in the fall and Corporal Crozier in the spring. The workshop's ball team, coached by Corporal McNeill, won the contingent championship in 1966 and also went on to beat the USA Embassy team in Cairo. Major E.B. Creber noted, "During the Dominion Day celebrations the workshop won some of the important events like volleyball and the 'private to major' relay race!"[6]

Travel and the opportunity to shop in exotic places were also an important part of a Craftsman's life. A program of rest leave was organized almost from the very start. Leave centres were set up in season in Cairo or Beirut with free transportation, tours and accommodation being provided. Tours were also arranged to many Middle East localities including Alexandria, St Catherine's Monastery, Jerusalem and Cyprus.

The workshop even had a mascot. The first was a donkey named "Craftsman UNEF" in 1957. The last was "Sergeant H.H. Baksheesh" who was 18 months old at the time of closeout in 1967.

However, accommodation for the men in Rafah Camp was not as exotic as the travel opportunities. The men were quartered in tent kits built of wooden walls and a canvas roof. There were other compensations, though, such as golf on some of the finest sand traps in the world or swimming at an excellent beach seven months of the year - all year for the hardy few.

The highpoint on the Craftsman's calendar was the annual Corps birthday celebration, and 1967 was no exception. The morning was filled with the usual assorted games culminating in a high-spirited game of volleyball with the corporals and craftsmen defeating the officers, warrant officers and senior NCOs. The afternoon started quickly with a game of donkey baseball. Sergeant Baksheesh nearly broke up the game when he decided to give amorous chase to the glamorous first base donkey!

Later in the afternoon several camel races were held but no one mastered the art as skilfully as Sergeant 'Lawrence of Sinai' Hansen, who managed to get more knots out of his ship of the desert than anyone else. A tug-of-war ended the sports events for the day. "If the corporals and craftsmen had played fair," commented Major Creber, "they would surely have lost. They found that 14 worked better than 10 so they easily overcame the valiant efforts of the warrant officers and senior NCOs to pull the rope to victory."

The day was appropriately climaxed by a very well-prepared steak dinner held in the men's mess followed by the awarding of prizes to the many winners of the day's events. Many 'Maa El Salamas' (good bye-to you without sand in your shoes) were also said on this occasion, although none realised that this would mark the final farewell which came just six days later.

A Decade of Service Ends

At 1700 hours on 19 May 1967 the UN Flag was ceremoniously lowered at King's Gate on the border between Israel and the UAR at the northern end of the Gaza Strip. At the same time, noted Major F.W. Chapman, the last CO, "The RCEME flag was lowered for the last time at 56 Canadian Infantry Workshop RCEME."[7] Thus ended a decade of service by the workshop for the United Nations Emergency Force. It was a decade in which 1,500 of Canada's Craftsmen had participated.

Spawned in the aftermath of one war, the workshop was suddenly dismantled in preparation for another. When Egypt requested the removal of UNEF1 from Egyptian territory it was originally believed that 45 days would be available to complete an orderly withdrawal. Plans were made which included a gradual reduction in workshop strength while continuing to give essential service to UNEF1. This and many other plans were made and dropped in quick succession as the withdrawal of the Canadian contingent was shortened from 45 days to 10 days to 48 hours. In the end, the workshop tools were packaged and left in the workshop for takeover by a member of the UN International Staff. Sadly, the M62 wrecker which had accompanied the last convoy from the workshop was left at the airfield as the last RCEME personnel departed for home.[8]

6. RCEME Technical Bulletin 12/3, pages 3-6.
7. It is now at the EME Museum in CFB Borden.
8. Chapman, LCol F.W.; taped interview with the author, 1983.

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The workshop had an operational commitment to meet the needs of the peacekeeping units it served - 24-hours per day, every day. During the first ten months of service the workshop carried out 1,500 vehicle repairs, and repairs to 7,500 other items. Over the years this proud record of service continued and was summarized by Major-General Indar Jit Rikhye, Commander UNEF1, on the occasion of what proved to be the last formal medals parade of the Canadian Contingent in April 1967. He praised the workshop personnel for their excellent record of service which "had increased the operational effectiveness of the whole of UNEF1."[6]

UNFICYP - Cyprus

At its evening session on 13 March 1964, Parliament authorized Canadian participation in a peacekeeping force then being formed for Cyprus.[9] 1R22eR was selected as Canada's contribution to the force. Meanwhile, three-dozen Craftsmen drawn from 5 Company RCEME were prepared to be the RCEME Increment for the 1R22eR. They were inoculated and trained and had participated in numerous Qui Vive Exercises before being summoned to Valcartier to join the regiment prior to its departure for Cyprus.[10] Once again Canada's Craftsmen had been called upon to help establish a peacekeeping force, and remained on duty until the Canadian close-out in the summer of 1993.

Operations Outline

From the moment of independence in 1960, Greek Cypriots determinedly opposed the constitution while Turkish Cypriots fiercely guarded it. A showdown was inevitable and in December 1963 they exchanged fire in Nicosia. Efforts to hold the fighting failed. Finally the UN Security Council adopted a resolution on 4 March 1964 calling for a cease-fire and the creation of a peacekeeping force whose function was to prevent recurrence of the fighting and to contribute to the restoration and maintenance of law and order.

The United Nations' Force in Cyprus (UNFICYP) came into being on 27 March 1964 as a 6,300-man force from nine nations. Canada's 1,150-man contribution included a four-company infantry battalion with motorized combat support elements, a reconnaissance squadron equipped with Ferret scout cars and force headquarters troops. The Canadians patrolled Nicosia and a 1,000 square mile area in the north central part of the island. Their task also included keeping open the strategic Kyrenia road linking Nicosia with the north coast. This assignment was reduced in December 1964 when the Canadians were relieved of the task of patrolling the Green Line which divided the Greek and Turkish/Cypriot sections of Nicosia.[9]

In 1969 UNFICYP was cut in half and reorganized. The Canadians were reassigned to the Green Line in Nicosia and relieved of their northern patrol task. The Canadian Contingent (CANCON) was reduced to 500 as the reconnaissance squadron and two infantry companies were withdrawn.

On 20 July 1974 Turkey invaded Cyprus. A seaborne assault backed by air strikes and paratroop landings was successful in driving a wedge from the beaches of Kyrenia to the Turkish section of Nicosia, which was the hub of the CANCON Area. The Canadians - comprising 1st Commando Group of the Canadian Airborne Regiment (CAR) - came under intense pressure in the airport area. Two days later a cease-fire became effective. In the first week of August the remainder of CAR deployed. CANCON was augmented by 500 men, medium and heavy weapons and 108 additional vehicles including 18 APCs and 7 Lynx (armoured reconnaissance vehicles). Fighting broke out again on 14 August and lasted for three more days until a second and final cease-fire took effect.[11]

In 1975 CANCON was reduced to 790 and the Canadians became responsible for Nicosia East and the airfield. By 1978 CANCON was further reduced to 500. At the time of its closeout in 1993, the 500-person Canadian contingent was provided by 2RCHA and was organized into City Battery (with responsibility for the Green Line in Nicosia) and Rural Battery (with responsibility south of Nicosia to the monastery at Louroukina). A large part of Rural Battery comprised reservists from many units across Canada.

9. Goodspeed, LCol D.J.; *The Armed Forces of Canada 1867-1967*; Queen's Printer, Ottawa: 1967; pages 259-261.
10. RCEME Technical Bulletin 10/2, pages 7-9.
11. Reich, Maj R.H.J.; unpublished notes, 1983.

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EME Operational Support

The repair workload for the RCEME increment started to build up even before the first Canadians arrived in Cyprus on 14 March 1964. The windshields of 17 Jeeps being transported by air were broken in transit. As Warrant Officer (Class 2) L. Boisvert of the RCEME Increment noted, "We had to adapt very quickly." Immediately on landing he made contact with British REME units already on the island. A local contract was made and within two days all windshields had been replaced. A record of excellent service had begun. More importantly, as Captain F.A. Ouimet commanding the Increment recalled, "We had become one of the regiment that we were supporting."[12]

A few nights later a call at 0100 hours from the regimental duty officer requested immediate recovery of a jeep which had crashed into a mud hut/house in a small village an hour's drive away in an area where tensions were still running high. It was to be a "short, sharp" recovery job recalled Captain Ouimet. His team was ready, having already set up stand-by arrangements with a nearby REME workshop for use of a recovery vehicle.[13] The recovery convoy included a recovery vehicle, a truck on which to load the jeep and armed escorts. It had to pass through two check points as it drove through sweltering 105°F heat on narrow roads to the accident site. Captain Ouimet admitted that "the frequent click of a Sten gun being cocked in the darkness at the road's edge made you a bit nervous." Once at the site, extricating the jeep, which was half inside the house, and loading it on a truck took only six minutes. An hour later the escort commander was able to breathe a sigh of relief as the convoy returned to camp.[12]

On 20 July 1974 as the invading Turkish troops drove into Nicosia, the 22-man maintenance platoon of 1st Commando was part of Logistics Company working and living in Blue Beret Camp near the Nicosia airport. Members of the platoon set up perimeter defences and loaded ammunition onto vehicles for deployment. The next day the Turks strafed and bombed the airport and the Greeks tried to land transport aircraft. Logistics Company was assigned to displace Greek Cypriots from positions in and around the airport. The Company prepared to defend the airport as a neutral area. As Master Warrant Officer D.A. Laramie recalled, "We spent many hectic hours eyeballing it with aggressive Turkish troops."[11]

Repair and Recovery for a Changing Role

Throughout the Canadians' time in Cyprus, the repair and recovery organization and methods continually adapted to changing operational circumstances. The initial role of the Canadian Contingent included patrolling a 1,000 square mile area containing many narrow stony roads in the Kyrenian Mountains. CANCON's vehicle establishment was approximately 27 Ferret Scout Cars, 86 Jeeps (many of which were used on patrols), eighteen ¾-ton trucks and 30 2½-ton trucks. In addition there were a number of vehicles (Bedfords and Land Rovers) which were rented from the British.

The RCEME Increment (which comprised approximately 33 all ranks) was responsible for all second-line repairs for Canadian equipment. The reconnaissance squadron had a 5-man increment for first-line repairs for its patrol jeeps. These unit vehicle mechanics averaged one *in situ* repair call per day. The average round trip for such a repair was about 75 miles, which on mountain trails meant up to four hours driving plus time spent on repairs. As a result, the reconnaissance squadron's increment was increased.

By the summer of 1965 the cost of renting vehicles from the British was causing concern. It seems that rent was being charged for vehicles when they were serviceable and in use as well as when they were unserviceable and waiting acceptance into the British workshops - which often took up to 21 days. Consequently, Corporal J.D. Dunsmore of the infantry battalion increment was loaned to the RCEME Increment in order to set up a control (2149) system. The control records quickly established when a vehicle was serviceable and in use or not. This evidence - plus an agreement to charge only for serviceable time - led to reduced cost for vehicle rentals.

More importantly this loan helped show the advantages of concentrating all RCEME personnel in one unit for increased productivity and flexibility. Consequently, RCEME Workshop Detachment Cyprus was formed in the summer of 1966 with an establishment of 48.

For light recovery work, particularly in the narrow streets of Nicosia and mountain roads of the Kyrenian Mountains, it was easier to use a ¾-ton truck with a tow bar. This was not fully satisfactory, noted

12. Ouimet, Capt F.A.; taped interview with the author, 1983; locations 303 and 220.
13. At that time the RCEME Increment didn't have one of its own.

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Captain M.G. Masuda, so in 1966 some of his technicians improvised a boom and hand-operated winch on the back of their ¾-ton truck.[14] This vehicle worked well. In one incident a jeep drove off a narrow road leading to an outpost and came to rest under a tree 200 metres below the road. Despite the advice that recovering this jeep would be too dangerous Warrant Officer (Class 2) J.B. Hynes recovered it using this small wrecker.[15]

On the reorganization of UNFICYP in 1969 the Canadians took on a static foot-patrol role. Consequently much equipment, including the Ferrets, was withdrawn and the RCEME workshop detachment was closed. Each unit going to Cyprus would take a 20-man element of its maintenance platoon under command of the platoon's master warrant officer. This did not sit well with the maintenance platoon commanders. It separated them from their men, which is not in the EME tradition. In 1973 Captain J.A.G. Langlois, Maintenance Platoon Commander for 3R22eR, stressed the importance of maintenance while in operation. He convinced his CO that a maintenance officer was needed in Cyprus. Because of manning restrictions an extra officer could not be taken so Captain Langlois replaced another officer whose duties he assumed along with a secondary responsibility for maintenance. The day-to-day running of the maintenance platoon remained the direct responsibility of the platoon's master warrant officer. {"It was a good experience," commented Captain Langlois, "for all technicians and myself. Working and living with each other 24-hours a day developed a team spirit much in evidence after our return home."}[16]

The maintenance platoon activities were abruptly changed in the summer of 1974 when Turkey invaded. The CANCON establishment of vehicles was doubled to 216 and the platoon's strength increased to 50. In the rapid reinforcement that summer CAR Maintenance Platoon's complete first and second line holdings of parts were brought. As Captain R.H.J. Reich noted, this included "...a couple of Skidoo carburettors which illustrated the rush in which we were sent. Harsh reality was having our Hercules escorted into Akrotiri airport by British jet-fighters, then unloading, receipting and sorting spare parts in the midst of pieces of shrapnel which lay everywhere in pieces up to several pounds. There was a heavy toll of tires and tubes."[11]

In early August the maintenance platoon painted the fronts of the Lynxes and the APCs white with UN markings on the sides. In August, after the second cease-fire, the platoon started on a two-month program to paint all vehicles white. Even after the cease-fire the platoon's workload remained high. Later that fall, as observation post manning was reduced and operational activity slowed down, the technicians got on top of the workload and returned to normal working hours.

By 1976 the maintenance platoon's workshop accommodation needed improvement and upgrading. That winter, the vehicle bays were finished in hard concrete, an office was built for vehicle inspectors and contract NCOs and the lubrication and inspection bays were rebuilt. In addition the spare parts section was re-catalogued and distribution accounts were revamped.[17,18]

By 1981 things were extremely quiet recalled Captain J.J. Thibault. Maintenance platoon was responsible for first, second and limited third line repairs to all Canadian equipment. The platoon was also responsible for all light recoveries on the island since the British did not have a suitable vehicle. Maintenance work was rarely disrupted by incidents because the great majority of the vehicles remained in the Greek sector where there was unlimited access. On the other hand, whenever there was a vehicle on the Turkish side, a pass was required and only available on certain days of the week.

After the rebadging in 1991 the EME Workshop CANCON Cyprus took on a definite EME look. The EME colours were painted 12 feet high along the full length of the outside of the workshop buildings facing the main approach road. Emblazoned on the colours was a huge 12-foot high EME badge. It was the first thing one would see a kilometre away on turning down the road towards the workshop. EME was very visible!

A Craftsman's Life

In between the disruptions for workshop improvements during 1976, noted Warrant Officer W.

14. RCEME Technical Bulletin 31/1, page 39.
15. It was still in service in 1974. Although severely damaged in an accident that year it was repaired and put back into service.
16. Langlois, Maj J.A.G.; letter to the author, 1976.
17. Pankew, CWO W.; unpublished notes, 1983.
18. Ric-a-dam-do, 2, 21 April 1976.

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Pankew, "...we maintained vehicles and equipment, went on leave tours, parades, dinners, etc."[17] A craftsman's day was busy and varied. There were unusual jobs too. In 1964 the Canadians found that the water pumps in the buildings that were to be used for peacekeeping outposts would not work. This represented a serious health hazard. The RCEME technicians soon discovered that the pump impellers had been sabotaged. After an intense search a local supplier was found, parts were purchased, and the pumps repaired.

The lack of a wrecker or other suitable lifting device made changing engines in 2½-ton trucks and Ferrets both difficult and hazardous. In 1967 the RCEME technicians designed and built a lifting device to fit on a forklift. The first version lacked a swivel hook, a fault later corrected.[19]

The piping of water into the hills for irrigating market garden plots was critical for local farmers. The RCEME Increment's welder, Craftsman N. Herriott, spent much of his time in 1965 repairing damaged and disintegrated water pipes under the direction of the UN Economics Officer.[17,20]

The technicians supported other activities too. In 1966 the Black Watch battalion presented several tattoos for the local populace. To provide the lighting for these tattoos, Corporal E. Paisley, a RCEME Electrician, usually worked a week setting up a 5kW lighting system.

Initiative was the order of the day by 1973. Many of the technicians became very proficient in repairing bicycles - a prime mode of individual transportation. In fact, one bicycle became the property of successive maintenance platoon commanders and was signed, "Bluebell Sunray!"

Part of the cease-fire agreement of 1974 was that CANCON would occupy the Ledra Palace Hotel in Nicosia. It became the main accommodation for the Canadian soldiers. A set of rooms was reserved in a quiet corner for those taking in-country UN leave. Many took advantage of this facility and had their spouses come over for a holiday in Cyprus.

Earlier accommodation had not been so exotic. In 1963 it was canvas tents on concrete pads with up to four to a tent. By 1972 the maintenance platoon was housed in 60 by 30 foot adobe huts. There were eight to a hut, which had cloth room dividers. In 1983, as Master Warrant Officer C.C. Shaddock noted, the huts had been greatly improved with air conditioning and more sturdy room dividers. By 1993 accommodation had become quite comfortable with each Craftsman having, in effect, a private room.

Production, however remained the main theme of a craftsman's day and contributed to a proud record of service. The CO of 3PPCLI in 1976 summarized this when he told his battalion on its return to Canada that "the technicians had maintained equipment for double our strength."[18]

Close Out

The last UN medals parade for CANCON was held on 26 May 1993. For the occasion the Royal Canadian Artillery and EME Colonel Commandants travelled to Cyprus. This was still a potential war zone, therefore the parade itself was composed of two representative 50-person guards. The day before the parade the two Colonels Commandant presented UN medals to members of CANCON in small gatherings at their places of duty. Colonel R. Jacobson, the Artillery Colonel Commandant, presented UN medals to the soldiers on duty in outposts on the Green Line. Colonel M.C. Johnston presented medals to the members of the Maintenance Troop in the EME Workshop in Blue Beret Camp.

This was the first occasion in which an EME Colonel Commandant had visited a UN mission and presented UN medals. After the presentation Colonel Johnston updated the Troop on EME matters and gave each member a gilt EME 50th Anniversary pin. Final preparations for the EME 50th Anniversary were beginning in the UN outposts!

In the early evening of 26 May, there was a hushed but expectant murmur across the old parking lot behind the Ledra Palace Hotel. The spectators were arriving for the last CANCON medals parade. It was a warm clear summer's evening, the sun was setting and a new moon was high in the sky over the officers' mess. "It was an idyllic setting and hard to believe that we were in the UN Buffer zone between the Turkish and Greek cease fire lines of the 1974 war," recalled Colonel Johnston. "The officers' mess just behind the parade square was a typical two-storey house with the red-tiled roof found throughout the tropics. I noted that it had several shell holes in it. It reminded me of another similar building in another place in another war

19. RCEME Technical Bulletin 2/12, page 21.
20. Millar, Col C.A.; taped interview with the author, 1975; Location 222.

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- the battle damaged two-storey house with red tiled roof that had been used as the ICCS team-site in Triton in the Mekong Delta in South Vietnam (see page 106). I had watched and reported on peace agreement violations there myself twenty years earlier before we closed the mission and returned to Canada. EME had been a peacekeeper for a long time!"

The regiment marched on parade to the music of the Petawawa Pipe Band. The parade included representatives from all groups in the 2RCHA. The five Craftsmen in the ranks were easily identifiable by their EME badges. Medals were presented by the UN Force Commander, the Artillery Colonel Commandant and the Commanding Officer. Each took a rank. Each was assisted by a sergeant carrying medals to be presented on a cushion. One of these sergeants was an EME sergeant.

The Cyprus Scroll

In 1985 the members of maintenance platoon of 3R22eR wrote on a roll of teletype paper: "Over the past twenty years Canadian soldiers served here in Cyprus on peacekeeping duties. To remember all maintainers that worked as vehicle techs, weapons techs, supply techs, fire system control technicians, clerks, radio technicians, metal technicians, we, the members of the maintenance platoon, who served in Cyprus with 3R22eR, from March to September 1985 decided to make this 'Maintenance Scroll'. We ask all Maintainers serving on this Island as Canadian representatives with the United Nations Forces to continue to sign the 'Maintenance Scroll'. Let us remember who served in Cyprus with the maintenance platoon." The message concluded with 31 signatures and the note that they were "ROTO 44."

And sign it they did - 17 rotations from 1985 to 1993! Some entries are funny, some are quite fancy and others are very informative. All are interesting. For example, the 2PPCLI scribe in September 1990 noted that many of the shops were refurbished and the contingent's 80 vehicles were replaced. The 1PPCLI scribe reports in 1991 that new EME badges were presented by the unit's commanding officer. The 3R22eR scribe noted in September 1992, "We had fun always!!"

When Colonel Johnston, the EME Colonel Commandant, visited 2RCHA for the last parade in 1993, he was given the scroll to bring back to Canada. This was no easy matter, he noted. "The Scroll was kept in a piece of 2-inch piping painted black and it had red end-caps. The Cypriot customs people thought that I was removing a valuable ancient scroll from the island while the Swiss thought that I was bringing a pipe-bomb into their country!" The scroll was given to the EME School for display. It was mounted on two long boards by Chief Warrant Officer R. Leclerc and put on display in the Sergeant Carson Building where it can be readily seen by a continuing stream of Craftsmen in training.

3R22eR Maintenance Platoon's request has been fulfilled. Canada's Craftsmen have remembered Cyprus and shown that they are "everywhere the action is!"

UNEF2 - Camp Chams and Ismailia

History records that on the morning of 6 October 1973 Egyptian President Sadat left his wartime residence, the Tahra palace in suburban Heliopolis, and motored to the Egyptian Operations Command Centre buried in the desert outside Cairo. The first assaults of the fourth Arab-Israeli war, the "Yom Kippur War," were due at 1300 hours. Egypt was to attack across the Suez Canal and Syria through the Golan Heights. The news of the war created considerable excitement amongst Canadians. Few military personnel realized the direct impact that the war would have on their lives during the following months.[21]

Operational Outline

By 20 October the initial successes of the Egyptian and Syrian armies had been blunted and the Israeli counter-attack across the Suez Canal was gaining momentum. On 23 October in New York, the Security Council passed Resolution 339 calling for a cessation of fighting, and requesting the Secretary-General to dispatch United Nations observers to supervise the cease-fire.

By the next day the situation for the Egyptian Third Army had become critical and Cairo was menaced by the Israeli crossing north of the Great Bitter Lake. The continuing war in the Middle East

21. Vlossak, LCol P.A.; *Operation DANACA*; FMC Newsletter, April 1975.

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threatened to draw in the superpowers. On the 25th, as rumours were mounting of possible Canadian participation in a Middle East operation, the Security Council approved the transfer of Austrian, Finnish and Swedish troops from Cyprus to the Middle East war zone.

Contingency planning at both National Defence and Mobile Command Headquarters concentrated on two possibilities. One was to augment the Canadian troops in Cyprus to fill in the gaps left by the departure of the three contingents. The other was to dispatch the United Nations Ready Force - the Canadian Airborne Regiment - to the Middle East. On the 26th a further option was introduced to provide service support, communications, engineers and air transport for the proposed 6,000-man United Nations force in the Middle East.

The noon news report on 1 November brought word of the USSR's opposition to Canada's participation in the Middle East force. Planning continued, however, as the United Nations worked on a compromise. The compromise, announced the next day, had Poland sharing the support duties with Canada. Canada would initially provide a signal unit, Poland an engineer unit.

Consequently, 1st Canadian Signal Regiment (1CSR) received the warning order to deploy to the Middle East. At Mobile Command Headquarters, another maintenance plan had to be prepared by staff of the SSO Maintenance and new parts scales prepared by 202 Workshop Depot. Orders were issued for each technician to take his tool box and one of each type of shop van was earmarked for shipment. Repair parts were packed and shipped to Trenton. Augmentees to 1CSR - including its maintenance troop - were warned and concentrated at various bases and then moved to Kingston. At 1500 hours on 6 November, the regiment was at eight hours notice to move. Further action awaited the decision of the United Nations and the Government of Canada.

Then began the long wait. On Friday 9 November, the third day at eight hours notice, strong rumours spread that Air Transport Command positioning flights were leaving Trenton for the Middle East. Then at 1615 hours it became official for the troops in Kingston. Operation Danaca, the provision of the Canadian Forces personnel to UNEF2, was underway. 1CSR was to be the main part of the Canadian Contingent. Master-Corporal N. Lundy and his Mobile Repair Team left by Hercules as part of the regiment's advance party, while the remainder of the regiment began deploying at 0900 hours the next day.

At 0245 hours on 12 November 1973, Cairo was quiet and pleasantly warm when the remainder of the advance party landed. This group included the Canadian Contingent's Senior Logistics Staff Officer, Major P.A. Vlossak, who recalled that "The city was blacked out and the streets were deserted. A white 'deuce and a half' bounced its way through a hastily-broken opening in a brick fence and came to a halt beside a large grandstand." A lone figure standing beside a pile of camp cots handed him one, saying "Welcome to the racetrack." UNEF2 was a reality.[21]

With the arrival later that day of troop 2IC, Captain B.F. Jeffery and a small group headed by Warrant Officer E. Kish, 1CSR Maintenance Troop commenced operations to provide first and second line repair and recovery for all Canadian equipment.

The maintenance problem was formidable. UNEF2 consisted of infantry battalions from Ireland, Panama, Peru, Sweden, Indonesia, Ghana, Austria, Senegal, Finland and Nepal. The Canadians and Poles provided service support. The multiplicity of equipment presented a challenge. The Swedes, Finns and Austrians had national equipment while the remainder had a mixture of Citroens and Unimogs as well as British and American equipment. The LORE technicians who had to support all this equipment had "...the five I's: Imagination, Initiative, Ingenuity, Improvisation and Inventiveness." They also had virtually no parts. The rapid mounting of the force necessitated a major effort to establish a maintenance system while concurrently providing service. While technicians did their best to cope with problems as they arose, the staff worked closely with UNEF2 Headquarters and the contingents to establish policies and procedures. This was a never-ending activity as the maintenance system based on the Canadian system was constantly being refined.

Camp Chams - The Racetrack

The Cairo racetrack was the initial home of the Canadians. Described as a desert in the middle of an oasis it provided no accommodation other than the grandstands. Everyone was accommodated in tents and temperatures were such that exposed metal parts burned the skin to the touch. Here the bulk of LORE

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personnel made their home. From the very beginning they not only helped with the camp set-up but also filled their roles as maintainers most ably. The tactical 5kW and 10kW generators were running 24 hours a day and were already breaking down. Every day more and more equipment was arriving at the airport.

Getting equipment from Cairo Airport posed its own problems. Only a certain number of vehicles were allowed entrance to the airstrip and the Egyptian guards controlled these by licence plate numbers. In order to enter the premises to meet incoming aircraft the correctly-numbered licence plates were installed on whatever type of vehicle was required for the specific load. The same plates were used over and over again - sometimes on the 5-ton wrecker, next on a 2½-ton, next on a staff car, etc. Some equipment arrived in non-serviceable condition. It was fortunate that the wrecker that had accompanied 1CSR stood up to the chore.

Another factor which helped was that the 1CSR had deployed with mobile repair team vehicles and ¼-ton trucks full of repair parts. These were the only spares that the Canadians would have for the next two or three months before repair parts which had been positioned in Trenton for the deployment started to arrive. The regiment had also brought some parts for the Canadian radios and switchboards that managed to keep the operation alive during start up.

LORE technicians also found themselves tasked with roles they had never imagined. By mid-November the encircled Egyptian Third Army in Suez City required rations and water, but the Israeli forces would not permit Polish transportation troops with UNEF2 to bring in supplies. Consequently, Canadians including LORE technicians drove Polish Contingent trucks to bring supplies to the Egyptians.

Hygienic conditions were almost non-existent in Camp Chams. The racetrack water closets were normally unserviceable which, with the large number of people coming down with gastro-enteritis, caused havoc. It took three to four weeks before a proper shower point was operating. The heat was stifling and washing facilities were almost non-existent.

The main body of the maintenance company arrived in early December and spent a week setting up shop and familiarizing personnel with the area. On 13 December 1973, with these tasks completed, Maintenance Company 73 Canadian Service Unit[22] became operational under the command of Major J.A. Boucher.

Logistics support of UNEF2 was divided between the Poles and the Canadians. Consequently 73 Maintenance Company was given some unusual tasks so that the overall balance and composition of the Canadian Contingent was acceptable at UN Headquarters. For example, noted Captain S.D. Morden, "The responsibilities of the weapons, electro-mechanical and telecommunications platoon included both first and second line maintenance of radio equipment. The inclusion of first-line maintenance in the Maintenance Company allowed more radio operators to be included in 73 Communications Unit. This was necessary because the size of the Comms Unit was fixed regardless of tasks."[23]

Once the main body of the maintenance company began arriving, a workshop layout was drawn up and put into effect. The company was still not "operational" because it had no tables, work-benches, special tools nor many of the other items required to operate a maintenance unit. These were to be provided by the United Nations. It was fortunate that the workshop vans had been brought since they came complete with many workshop tools. In addition, each tradesman had brought his tool box. Work benches were manufactured from packing cases. By a stroke of luck, the control clerk had brought along a typewriter, a set of Canadian Forces Technical Orders, and the nucleus of items required to set up a control office. This was the only office equipment for some time!

LORE personnel were not the only people in trouble. The spare parts platoon which was located across the road from the workshop had nothing: no shelving, no tentage and no stores. Pens became collectors' items, not only for the maintainers, but for every unit in the contingent.

As the buildup continued a shuffle of personnel took place along with the reorganization of the Canadian Contingent. The 1CSR Maintenance Troop became part of 73 Canadian Service Unit and was responsible for Contingent first-line maintenance. The regiment's maintenance officer became the maintenance company's production officer and its foreman of signals became its ETSM. Later, after the members of the 1CSR Maintenance Troop rotated back to Canada, the first-line platoon became part of the

22. Later the name was changed to 73 Canadian Service Battalion.
23. Morden, Capt S.D.; report, 1974.

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maintenance company.

Throughout the Camp Chams deployment, the provision of service steadily improved. Local contracts were arranged - sometimes with local sidewalk shops after copious quantities of mineral water and coffee and lots of sign language. As well, MRT and recovery services were put in place. UNEF2 was also changing. At the end of January 1974 the buffer zone in the Sinai was created. In May the Irish Battalion left for home. In June the United Nations Disengagement Observation Force (UNDOF) was established to occupy a buffer zone between Syria and Israel. UNEF2 provided the Austrian and Peruvian Battalions along with a Canadian logistics company and a Polish transport platoon. In May the Canadian contingent moved to the El Gala Airfield in Ismailia, located near the mid-point of the Suez Canal. By July the Maintenance Company was in its new home.

In reflecting on the time in Camp Chams, Master Warrant Officer R. Aubuchon, who was a member of the original contingent, noted, "One thing I honestly believed is that the Canadian soldier is the best. No man could have achieved, under the conditions that we lived, the goals and the challenges of setting up and operating a workshop to maintain equipment in a 'many contingents' peacekeeping organization."[24]

Ismailia

El Gala Airfield in Ismailia was a former Royal Air Force Base. The buildings, although they had suffered considerable damage during the wars, provided much-improved accommodations and an infinite source of self-help projects. The camp was centrally located, although separated from the city of Ismailia by a "sweetwater" canal. In July 1974, Maintenance Company occupied two of the smaller aircraft hangers and a small parking garage as working accommodation. Ismailia was home to the Canadian maintainers until the mission closed.

By this time the company had also achieved a stable organization and establishment. Its 160 Craftsmen were responsible for all Canadian first-line support as well as force second-line support. It had a small headquarters and three platoons: a workshop platoon for second-line vehicle and generator repairs, a weapons and electronics platoon, and a servicing platoon for first-line support to Canadian Contingent vehicles.[25]

Problems also became more easily identified - if not rectified - and progress was steady with everyone contributing to an improving maintenance situation. Problems dealing with other contingents continued to exist. In a letter to the OC Maintenance Company in 1975, Master Warrant Officer A. Boudreau noted, "A Captain from Finbatt, who did not identify himself, left a Finbatt mechanic at Vehicle Platoon and stated that he was one of four mechanics requested by Maintenance Company to assist in servicing the new bus. When asked how long he was to remain with the company, the Captain replied 'Don't keep him longer than one year' and drove away. This individual speaks Finnish only and for the few hours that he has been here, nobody has been able to communicate with him!"

By 1976, UNEF2 had only four battalions to be supported - the Finns, Swedes, Ghanaians and Indonesians - and life was relatively routine. Relatively routine does not suggest any absence of problems nor the absence of work. The company completed 250 to 300 work orders a month. Equipment was slowly standardized as equipment that had originally been brought by contingents wore out and was replaced by the United Nations.

Parts and tooling, however, were a continuing source of irritation. Controlled cannibalization and reclamation of usable parts from the crock park, affectionately known as "K-Mart," were indispensable field expedients. Desert living conditions gave repairs to refrigerators and their associated generators the highest work priority. A tremendous effort continued to be devoted to scaling repair parts and to finding local contract sources in Israel and Egypt.

Winter proved to be another problem because personnel failed to appreciate that although it was warm by Canadian standards, the temperature daily dropped 25 degrees between noon and midnight and people were cold even if it was 15°C. Weapons technicians found themselves inundated with heaters needing

24. Aubuchon, CWO R.; letter to the author, 1977.
25. 73 Cdn Svc Bn Reports.

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repair.

The Egyptian Army operated the ferries and bridges across the Suez Canal and waiting time varied from minutes to hours. This ultimately resulted in a detachment of the service battalion being formed at El Tasa in September 1976. The first maintainers to set up shop were, Sergeant R. VanTassel, Master-Corporal T. Evans, Corporal H. Hemphill and Private W. Brooks. They found that El Tasa was not much - only a few huts and a water point in the Sinai about twenty miles in from the canal. However it was central and did not depend on the ferry service. In addition, since it was home to a recovery crew and a mobile repair team, it provided an excellent equipment collection point and a staging area from which additional maintenance assets could be deployed.

Recovery was one of the constant challenges. Recovery vehicles with names like "Happy Hooker," "Black Jack," "Desert Queen" and "Sinai Princess" roamed the Sinai covering between 10,000 and 11,000 kilometres every three months and were hard-pressed to keep up with the large number of unserviceable vehicles. If a sand drift blocked a road, recovery was positioned on either side to winch vehicles through if they could not cross under their own power. The LORE technicians proved themselves to be force-oriented and did not hesitate to cooperate if cooperation assured success.

Innovation and imagination continued to play a vital role. Typical of the problems overcome was the use of Australian helicopter resources to recover jeeps from areas inaccessible to the 5-ton wreckers and the use of wagon trains in which a wrecker would tow two 2½-ton multi-fuellers, each with a jeep in its cargo box, across the Egyptian army pontoon bridge at Quanterra and back to Maintenance Company.

LORE technicians tackled every problem as professionals. When the Chief of the Defence Staff came to visit and his aide failed to bring the general's licence plates, it was Private T. Steeves, a vehicle technician, who hand-made the four maple leaves and plates. When 10KVA generators arrived on inadequate trailers and with minuscule fuel tanks, Maintenance Company technicians mounted the generators on ¾-ton trailers with larger fuel tanks. Contingents had difficulty safely operating the gasoline-fired M2 cooking burner and it was Maintenance Company technicians who solved the problem by converting them to butane. When jeep differentials became a problem it was Maintenance Company technicians who found a way to repair them in-house. When it became obvious that the Ghanaians and Indonesians needed first-line help, LORE detachments were formed and co-located with them.

A Craftsman's Life

As the provision of maintenance services improved so did the quality of life. The average technician devoted a normal working day to his maintenance duties and then addressed his own and unit accommodation problems. Long-abandoned barrack blocks with windows blown out, no electricity and no ablution facilities had to be fixed up, so electro-mechanical technicians rewired, weapon technicians worked with the plumbers and vehicle technicians screened windows. Swimming pool kits were flown in from Canada and installed by the contingent. Everyone got to make cement. An FM radio station was established and technicians manned it both as announcers and station engineers. A ham radio station was set up to permit calls to be made home and it too was manned by volunteers.

United Nations leave was given and tours arranged in theatre to the Valley of the Kings and Alexandria in Egypt as well as to Israel. A Mercedes tour-bus was purchased with non-public funds and used primarily for the Israel tours. Maintenance Company provided normal service to it as well as ensuring that a Vehicle technician went on every trip. By 1979 life had become reasonably comfortable and LORE personnel could look forward to six months of challenging work and about 150 evening movies - most of them bad.

Close Out

With the signing of the Camp David Accord, UNEF2 was closed on 24 July 1979. Canadian maintenance personnel worked in the Buffer Zone and Ismailia supporting the close out until 23 October. This work included the return of all equipment from the Sinai to Camp El Gala; the provision of assistance in moving the Finnish Battalion to UNDOF (Operation Finnigan); the closing out of all local maintenance and repair contracts; the redistribution of Canadian equipment to the Golan, Cyprus and Lahr and; finally, the hand-over of Maintenance Company to the UN International Staff.

One important aspect of the close-out, noted Captain J.D. Dunsmore, "...was the systematic

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withdrawal, evaluation and preparation for disposal of equipment spread amongst several national contingents throughout the Sinai and along the Suez Canal." It was far different from the close out of UNEF1!

On notification of the close-out a conference was soon convened by 73 Canadian Service Battalion to plan close-out details. Within 45 minutes of the start of the conference a team was heading into the desert to start on-site life-remaining evaluations of all equipment, which ranged from "knives, forks and spoons" to trucks. Soon teams were located at each of the national contingents. The work of the teams was expedited by close co-ordination from Maintenance Company - particularly in scheduling the movement of equipment over the Suez - and by the initiative of LORE technicians. On the first day, Private D.F. Dielman (a member of the team sent to the FINNBAT) made a detailed list of the status of all vehicles. This facilitated scheduling movement of equipment to Ismailia. Later on Captain Dunsmore visited the ferry site over the canal where a vehicle technician from the Maintenance Company was employed as a driver. He ferried equipment from the SWEDEBATT over the canal. The technician had been on duty for 24 hours and, when offered relief, replied "No sir, I started this. I'm going to finish it." That, perhaps, reflected the typical LORE attitude.

On 31 October 1979, Lieutenant-Colonel K.K. Murata, the last CO of 73 Canadian Service Battalion and the last member of the LORE Branch serving with UNEF2, left Ismailia. Once again Canada's Craftsmen had completed a job well done in the Middle East.

UNIFIL - Lebanon

Internal strife erupted again in Lebanon in April 1975. Peacekeeping forces on the Egyptian (UNEF2) and Syrian (UNDOF) frontiers did not prevent the escalation of violence along the Israeli-Lebanese border. Using Lebanon as a base, the Palestine Liberation Organization (PLO) waged a campaign of terror into Israel. This culminated in an Israeli invasion on 14 March 1978. The United Nations Interim Force in Lebanon (UNIFIL) was established on 19 March to secure the withdrawal of Israeli forces, restore peace and security and return the area to Lebanese control.[26]

Canada responded by agreeing to provide signallers for a period of six months.[27] Initially 90 Canadian signallers assisted in Lebanon. Then, in response to the increasing violence, UNIFIL's strength was increased from four to six thousand. Canada's contribution was increased to 120. The Canadians were withdrawn in October 1978 as originally planned.[26]

The Canadians were based on Camp Pearson at Naquora on the Mediterranean. The camp's purpose was to support the signals detachments scattered among the various national contingents. "For six months I shared a tent with two French cooks," noted Corporal R.F. Kendrick. "They didn't learn much English, but I learned quite a bit of French and I enjoyed every minute of it!" However, he noted soberly, "We were in a war zone. There was barbed wire all around the camp and I did my turn on sentry duty." For the signals detachments away from headquarters, accommodation was usually more spartan. The observation posts were frequently being shelled.

Each detachment had a vehicle with communications equipment plus generators, dug into bunkers. Consequently maintenance was done in situ. As Corporal Kendrick noted, "The detachments were resupplied every week. My job was to go around to the ten different locations, provide resupply, check the equipment and assist in maintenance where I could. We also had a small workshop in a marquee tent in Camp Naquora, but we didn't have many tools or parts. We were able to arrange some repair by contract in Tel Aviv."

On 12 July, in response to complaints about border infiltration by Israel, the UN took 200 PLO prisoners. In retaliation the PLO captured forty-nine UN soldiers, including Corporal Kendrick's three-man team which was returning from a resupply/maintenance run to one of the signals detachments. As he recalled, "We were ambushed and ordered out of our vehicle and ordered to give up our weapons. Standing back-to-back with loaded weapons pointed, we argued and refused to give up our weapons. After many threats and counter-threats we finally agreed to go to a PLO camp where a message was sent to UNIFIL Headquarters. All the while we kept our weapons and ammunition. About three hours later, we were released and drove to our camp at Naquora. When we arrived safely we discovered that our message had not been

26. Gaffen, Fred; *In the Eye of the Storm*; Deneau and Wayne, Toronto, 1987; pages 150-157.
27. At that time Canada's supply of signallers was being strained as UNEF2 was also in operation.

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passed to the unit and that the CO and RSM were out looking for us. It turned out that we were the only ones who did not lose their vehicle or weapons." Corporal Kendrick was awarded a Chief of Defence Staff Commendation.[28]

UNDOF - The Golan

The cease-fire agreement signed by Israel and Egypt in late October 1973 brought a measure of peace and hope to the Middle East. Unresolved differences remained, however, and as a result, sporadic conflict between Israelis and Syrians continued on the Golan Heights until late in May 1974. It was then that efforts to negotiate a cease-fire succeeded and, following United Nations Resolution 350, the United Nations Observer Force (UNDOF) was created on 3 June 1974. Drawn from four contingents of UNEF2, UNDOF included operational units from Austria and Peru as well as supporting units from Canada and Poland. The force was to be deployed between the Israelis and Syrians on the Golan Heights.

Operational Outline

The first task of UNDOF was controlling the process of separation and disengagement of forces in cooperation with Israeli and Syrian military officials. The second task was to supervise the area of separation and conduct inspections within the areas of limited armaments and forces in accordance with the agreement and its protocol.

Canada contributed staff for UNDOF headquarters, provided signals support and established a second-line logistics organization. Originally designated Logistics Company, K Brigade, UNDOF, it was more commonly called CANLOGCOY or CANLOG-UNDOF and included about 120 Canadian regular and reserve soldiers committed to the support of the 1,200 members of UNDOF.

For the past twenty years the UNDOF mandate has not changed. There are now 215 Canadian servicemen and women in the Canadian Contingent (CANCON), serving in Camp Ziouani as well as in Camp Faouar in Syria. CANCON provides second-line transport, supply, maintenance support and communications for UNDOF. It also performs its own first-line tasks in those areas as well as: operations, finance, construction engineering, medical, and camp services. CANCON shares Camp Ziouani with the Polish UNDOF unit, POLBATT. Camp Ziouani is 63 kilometres from Damascus and 56 kilometres from Tiberias.[29]

Deployment to the Golan

In anticipation of the UN decision, Movement Order #1 dated 02 Jun 74 had placed CANLOGCOY on 12 hours' notice to move. Thus, within 24 hours of its creation, the deployment of UNDOF commenced. The start line was crossed at 0200 hours on 4 June 1974 at Camp Chams on the outskirts of Cairo.

Aside from the normal administrative difficulties associated with last-minute adjustments to personnel and vehicle lists, the departure went well and was on schedule. However, two incidents quickly reminded all personnel of the realities of operations and administration. The first involved a member of the Polish MP detachment assigned to guide the convoy to the Israeli border crossing. Unfamiliar with the route and without a map, he departed from the assigned route on crossing the Suez Canal. The error, however, was quickly spotted. Moreover, as the road was only one lane and the surrounding areas potentially mined, the importance of convoy discipline was clearly highlighted. Fortunately an alternate route was quickly secured and the convoy was soon enroute once again - this time with the Polish MP toward the rear.

The second incident occurred when the Canadian convoy arrived first at the Israeli border, although not scheduled to do so. The Israelis at the checkpoint were for their part not expecting a Canadian convoy. Patience and higher Israeli headquarters action soon resolved the delay and, with an Israeli guide/escort, the move continued.

After a full day on the road, the convoy harboured in Tiberias for the night while a small advance

28. Kendrick, Sgt R.F.; *experiences in UNIFIL*; taped interview with the author, 1995.
29. Jennings, Capt M.A.; *Update on EME in the Golan*; unpublished notes, 1995.

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party moved onto the Golan to rendezvous with the reconnaissance party at the UN Control Centre in Kuneitra. The move was completed shortly after dawn on 5 June when the main body arrived complete and without anyone "on the hook."[30]

Setting up Shop

The initial deployment site was an old Syrian army camp which had suffered serious damage during the previous conflicts. There existed only four buildings with roofs and the entire location was strewn with unexploded munitions of various types.

The value of including an Ammunition Technician, Sergeant R.S. Enman, on the unit's establishment was quickly realized. He provided basic instruction and supervised much of the munitions clearance activity. Unfortunately he could not effect demolitions as he had been unable to acquire the necessary explosives from either Canadian or UN resources. The camp was nonetheless cleared of all munitions - including some referred to by one Israeli as "communications equipment."

The setting-up process could now proceed rapidly. The unit was declared fully operational three days after its departure from Cairo.

Preparation of the site continued while the UN negotiated for its allocation to them. Meanwhile the Canadians supported UNDOF from the back of trucks without off-loading more stores than was necessary. Formal approval of the site was achieved within three weeks. Then plans for camp development and improvement were put into high gear. "Of the existing covered buildings," recalled Major D.K. Porter, the CO, and Captain P.D. Kerr, the DCO, "the largest provided two bays suitable for maintenance and became the 'Bluebell Garage'."[31]

The remaining covered buildings were too small to use as warehouse space and eventually became the HQ, transport office, post office, and officers/WO/senior NCOs combined mess. Warehouse space and personnel accommodations were then established on the hard standing provided within the remaining roofless buildings. However, despite every effort to sandbag the upper walls of these buildings and tie down the canvas roofs that had been erected, the steady winds soon wore out the canvas at the walls and forced the establishment of a tented camp. This situation existed for the next several months while a small team of Canadian Engineers were dispatched to UNDOF to assist in the formulation and implementation of an approved accommodation plan. Their efforts resulted in the provision and installation of suitable portable shelters acquired from Turkish sources prior to the onset of winter.

The abundance of so many well-ventilated buildings did, however, lead to the adoption of "Camp Roofless" as the name for the Canadian portion of the camp, which was also shared with the Peruvians and formally called "Camp Bolivar." As time passed so did names and contingents. Currently, the camp is called Ziouani by both Canadians and their neighbours, the Finns, who succeeded the Peruvian and Iranian contingents.

Workshop Glimpses

The first weeks were exceptionally busy and dedicated to supporting UNDOF while settling in to the new surroundings. Everything from the provision of power to the provision of showers and, better still, hot showers was required and provided with the assistance of LORE craftsmen and their ingenuity. The maintenance platoon, under the command of Acting-Captain R.F. Keats and with Master Warrant Officer D.F. Steward as 2IC, remained committed to force maintenance and was soon identifying maintenance support sources throughout Israel and in Lebanon. They fulfilled their mandate to provide maintenance support. Canadian soldiers maintained equipment as varied as Peruvian Unimogs, Polish Gratz (15 tons), Austrian Steyr, Finnish SISU and Swedish BV202, as well as Canadian and American vehicles. As another example of the variety of equipments which challenged LORE craftsmen, there were over twenty-two different types of generators from around the world operational in UNDOF.

The LORE members of the force were often involved in unique duties. On 9 August 1974 the entire Canadian Contingent in the Golan Heights became very personally involved in the saddest of all duties. It was on that date that Syrian anti-aircraft troops shot down a Canadian UN aircraft, killing all nine Canadian

30. *Camp Roofless*; DND film, 1976.
31. A sketch of this workshop is at the top center of the EME 50th Anniversary poster.

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servicemen on board. The unarmed Buffalo aircraft bearing the required UN markings had been flying from Ismailia to Damascus via Beirut on an approved schedule and flight corridor when it was shot down by Syrian missiles northeast of the town of Al Dimas. Supported by members of other UNDOF contingents the CCUNDOF led the solemn task of gathering the remains of their comrades and returning them to Canada for burial. The aircraft wreckage also had to be collected pending a decision on its disposal.

The tradition of cooperation among UN contingents and service to others is typical within UNDOF and continues with its mandate. In the summer of 1982, UNDOF and its Canadian contingent provided support to relief convoys despatched to the Lebanese cities of Beirut and Baalbeck following the Israeli movement into southern Lebanon.

The same cooperation is demonstrated by Canadian recovery personnel in the execution of their role. On 6 March 1983, for example, an Austrian transport vehicle carrying two large generators was recovered from where it had overturned while trying to cross a flooded bridge. The subsequent recovery operation was a Canadian responsibility and involved two Canadian 5-ton wreckers as well as Polish MP traffic control, mine clearance teams and the use of a crane belonging to the Polish contingent. After the area had been cleared of land mines, the vehicle was righted by a Canadian recovery crew using their wrecker. The Poles were then able to use the vehicle casualty as a platform and attach chains to the two generators, which remained submerged on the bottom of the flooded wadi. After the Polish crane operator had removed one generator the Canadians recovered the vehicle. The crane then recovered the second generator. Austrian vehicles were then loaded with the generators, which had not suffered any additional damage as a result of recovery. These along with the vehicle casualty were recovered to the Canadian maintenance platoon for the necessary inspection and repair.

While workshop activities can generally provide professional satisfaction, some can also result in very tangible benefits to the soldiers and technicians. In 1981 Master Warrant Officer L.A. Laidlaw built a mini-bus for recreational purposes. Starting with the wrecks of two such vehicles in the scrap compound he soon organized a project to build one serviceable mini-bus using the rear body of one welded to the front of another. Put together with LORE talent and professionalism, morale was given an appropriate LORE boost.

The strength of the maintenance platoon in the Golan in 1995 was 36 all ranks organized into two groups. The control office group was run by the Engineering Technician Sergeant-Major and comprised sections for contracts, planner/receipts & issues, inspection, scaling/repair parts stores and toolcrib. The production group was run by a Warrant Officer and comprised sections for vehicle, vehicle detachment Camp Faouar (heavy equipment), electronics and ancillary. The electronics section included communications and fire control systems while the ancillary section included weapons, materials, refrigeration & mechanical and plumber gas fitter.[32]

"UNDOF is also the only place where the weapons technician seconds as a plumber gas fitter and as a bicycle repairman. You don't talk to a fire control system technician who has served in the Golan about photocopiers, as he's likely to lose control! It is also the only place where the materials technicians pride themselves on not doing rabbits!" Captain M.A. Jennings noted in 1994.[29]

One of the many challenges for the EME technicians was the non-vehicle annual technical inspection (ATI). There were many desk lamps, refrigerators, stoves typewriters and other miscellaneous UN equipment used by the various national contingents. Technicians did the work using lists prepared by the contingents using the equipment. The lists, however, were prepared in the using contingent's language and often not all equipment could be found!

The current workshop garage was officially opened on the 31 May 1986 by Major-General Highland, Force Commander, UNDOF, at the time. Prior to that, maintenance was scattered around the camp in several buildings. The new building consolidated all functions into one.[33] Adjacent is the original workshop which is now used as a supply R&I warehouse and is one-third the size of the new workshop. New additions to the workshop included the Bluebell Corral and Bluebell Saloon (out-door and in-door rest easy areas) and a new repair parts stores section mezzanine.

Duty recovery is something that all vehicle technicians in the Golan get a chance to do. Some have less experience than others. However they all strive to do as professional a job as they can. This was

32. Refrigeration & Mechanical (R&M) and plumber gas fitter are normally construction engineer responsibilities.
33. Earles, Sgt P.J.; taped notes and photo, 1992.

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demonstrated in 1994 when the maintenance officer received a letter of appreciation from the force provost marshal for a recovery job done by Corporal J. Blackmore and Craftsman D. Sirois. They recovered two Toyota Land Cruisers in Observer Group Golan-Tiberias. These vehicles had been damaged by a cement truck which had lost its brakes and gone out of control. This recovery was done in Tiberias on a very steep hill with a lot of traffic. Both technicians performed extremely well under pressure. By analysing the situation and performing minor repairs they recovered both vehicles and ensured that one was mechanically safe and driveable.

One recovery job took over a year to do! In 1988 on a cold and frosty September morning an operator placed the key into the control panel of UDOF's largest piece of heavy engineering equipment. The POLLOG construction engineer had been tasked to finish a new roadway from the AUSBATT position to the peak of Mount Hermon, a distance of two kilometres. Normally the Caterpillar D8 bulldozer started with just one turn of the key, but not on this particular day.

First-line maintenance technicians were called upon to find the cause and correct the problem. Their efforts were in vain. The cold, lifeless 55-ton tracked earth mover refused to reveal its secret. It was late September and the high winds combined with low temperatures at 2,815 metres above sea level on Mount Hermon promised that winter was near. The D8 Cat was a priority as the road had to be completed before the snow arrived.

Later that week an urgent call was placed through UNDOF HQ to CANLOG. Two mechanics were dispatched. Eagerly they searched for the illusive gremlin which prevented the machine from starting. They soon determined that the engine was seized and would have to be removed. It was planned to use the 10-ton mobile crane from POLLOG to remove the engine. However, October had brought a layer of snow in the uppermost regions of the craggy mountainside and the temperature had fallen to -10°C at night. It was agreed that it was now too dangerous for both personnel and equipment to attempt to remove the engine. Parts already removed were placed inside the cab of the machine and the doors locked to await spring when the snow would clear. The D8 became known as the "Mount Hermon Monument."

During the winter months, AUSBATT soldiers stationed at Post Hermon dutifully maintained vigilance over the hulking white and black mass while on their patrols up and down the mountainside. Early May saw the return of the CANLOG mechanics to the scene along with the POLLOG crane. While the "D8" appeared the same it was found that someone had smashed the cab window to gain access. The windshield wipers and headlights had been taken and the electrical wiring damaged. This did not dim hopes that the monument problem would soon be solved.

The Polish crane operator positioned his machine while the Canadian technicians set to work with wrenches. Removal of the engine was hindered immensely by 80- to 100-kilometres per hour winds and frigid temperatures. Windbreaks of heavy canvas were erected to give the crew some degree of protection. The problem was further complicated by the fact that the machine was perched on a 30° incline. After a week of hard work the CANLOG/POLLOG crew of five completed the removal. AUSBATT personnel on Mount Hermon generously provided room and board to the monument mountaineers. During the evenings in the "Hermon Hotel" accounts of the day's events were discussed over hearty Austrian suppers.

During the reconstruction of the engine in Haifa it was discovered that a waterpump bolt had sheared off and fallen into the camshaft timing gear, resulting in the seizure of the engine. In mid-July the rebuilt powerplant arrived back at CANLOG and a maintenance team was dispatched back to the mountain to install the assembly.

The Austrian personnel from Post Hermon greeted the maintenance crew with their traditional warm welcome and inquisitive questions. "Would the monument solution finally be found?" Time would tell as the crew put the recovery vehicle and the truck carrying the powerplant into position alongside the Caterpillar in its precarious position.

Three hours later the huge powerplant sat on its mounting frame. Replacement of the many lines, fittings and brackets proved more time-consuming. Adding spice to the operation was the rotation of personnel which took place between the removal and the replacement of the engine. Discovering where each part went taxed the new crew's imagination to the limits. Two days later the two gigantic batteries were hoisted into place and connected to start the engine. Everyone waited in anticipation and after a few huffs and puffs, the bulldozer finally sputtered to life. A sight of relief mixed with joy was felt by everyone present.

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The monument problem was solved. Or wasn't it?

Sadly, the answer was no. Whoever had taken the headlights and windshield wipers had also taken a small driveshaft used to connect the powerplant to the brakes and steering systems. While the engine worked, the bulldozer itself could not move without this driveshaft. Another ten days passed before a new one arrived and the crew could install it. Preliminary maintenance done, the D8 was started up once again for a test run. All things checked out and the job was finally finished. POLLOG operators were standing by and they quickly got to work completing the task started almost 12 months earlier. The road got built and, as Sergeant B.D. Wilcox noted, "I am sure everyone is hoping that we may never again see another Mount Hermon monument."[34]

There is humour, too, on the workshop floor. For example, the "Hammer" is a power bar with a socket swivel on which a hammer head has been welded. It is attached to a belt so that it can be carried around the waist. "The Hammer Award" was instituted in 1974 as a way of having a bit of fun. "We watched each other during the week. Then at the "O" Group during Friday's beer call, we would regale each other with stories as to who had made the worst mistake during the week. The winner got to wear the Hammer for the week," noted Sergeant P.J. Earles.[33] On his second tour to the Golan in 1990 he saw that it had been discontinued. It had been a great stress reliever and had added to the camaraderie and unit spirit of the Craftsmen, so after a quick word to the ETSM, a new one was made and the Hammer Award was reinstated. Five years later Captain Jennings reported that "it is presented to the member of the EME Saloon or EME Coral that makes the 'worst' work-related goof of the week. All members present at the Friday platoon beer call can nominate someone for the Hammer. All nominees must leave the room while the rest of the platoon (usually a Kangaroo court) votes for the most deserving candidate. After the platoon makes its decision and the nominees have returned, the most deserving candidate is presented the Hammer by the MC of the Hammer. The Hammer is worn around camp for one week whenever the member is in uniform.

"The Ultimate Hammer (originally the first Hammer) is a larger version of the weekly Hammer and is presented to the member who makes the worst goof during his/her tour. The Ultimate Hammer is worn the second-last week of the winner's tour."[29]

A Craftsman's Life

No soldier's life can really be considered complete without the benefit of some relaxation and perhaps some non-duty involvement in local concerns. When the members of the Canadian contingent became aware of the existence and needs of the Sisters of St Joseph Orphanage in Jerusalem, in typical Canadian fashion they embarked upon a commitment of support. Financial aid through collections resulted in more than three thousand dollars being donated prior to Christmas 1982. Support on a more personal level has also been given through personal contacts and events such as the concert by the CFE Pipes and Drums provided on 1 March 1983 on the orphanage's patio to a curious and appreciative audience.

Those who want to explore the Holy Land and its history seldom have to travel far as it is little more than an hour's drive to either Tiberias or Damascus. The Souk in Damascus is as popular for shopping as is the Sea of Galilee for a summer swim. Even Jerusalem, the Dead Sea and Tel Aviv on the Mediterranean are an easy weekend trip when workloads permit.

Prior to 1993, leave travel allowed soldiers to travel to other parts of the Middle East or to Canadian Forces Europe. Spouses were accorded special consideration on service flights and many took advantage of guaranteed space on the bimonthly Hercules flights into Damascus to share UN leave with their mates.

For those who prefer to hike, that too can be arranged. In 1981 for example, Captain J.D. Poirier, the OIC Maintenance Platoon, teamed up with two other Canadian officers to participate in a challenging Austrian-inspired 40-kilometre march up Mount Hermon. The LORE CANLOG spirit was evident as the other contingent's teams were startled to see a CANLOG vehicle deliver the mid-march meal. The rocky slopes of Mount Hermon are indeed an unusual setting for a meal complete with attentive waiter and a table set with linen, silverware, dishes and, of course, wine. Thus nourished, the Canadian team's success was assured!

On 15/16 October 1994, the Austrian Battalion held their last AUSBATT March of the year. This forced march competition is open to all members of UNDOF and follows the patrol routes along the area of

34. Wilcox, Sgt B.D.; *The Mount Hermon Monument*; The Golan Journal, 1990.

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separation between Israel and Syria. It takes two full days and covers a distance of 45 kilometres, most of which is on trails up steep inclines. The march starts on the outskirts of the war-destroyed city of Quneitra in Syria and finishes on the top of Mount Hermon at the highest UN position in the world. The aim is to complete the march as a team in two days. "Our secondary goal as maintainers in celebration of the EME 50th year," noted Master-Corporal W. O'Regan, "was to fly the EME flag at the top of Mount Hermon."[35]

"Day one was an early (0530hrs) start for us," he continued. "The terrain on this day was mostly flat with some inclines as we covered 24 kilometres. Along the way we met up with many local shepherds wondering what we were trying to accomplish. On day two we were up at 0300 hours for breakfast and started at 0500 hours. The terrain dictated our pace; lots of steep verticals on dangerously narrow and rocky goat trails. There were breath-taking views of Israel, Syria, and Lebanon. The weather was cool with an intermittent light rain to make the trails slick. The last kilometres were the hardest of all. The fatigue of both days set in as well as the cool and damp weather, not to mention the blisters. We all had the same thoughts of "where is the top" and "will this ever end." Trying to keep everybody motivated was a job on its own but the benefits of teamwork paid off. The feeling of crossing that finish line was one of an overwhelming sense of pride and accomplishment, as our EME flag flew high and proud."

{The camp's facilities were originally limited to a movie projector and volleyball net. By 1983 they included a swimming pool, ham radio, theatre, furnished messes and even VTR. A great deal of sport activities were offered in 1994, including baseball, floor hockey, karate, and even a weekly run to a local sports centre. Some social events included platoon gatherings at the Bluebell Corral or Bluebell Saloon, and recreational runs for dinner in Tiberias or to the beach in Natanya. The camp also offered entertainment events such as mess social functions, movies and various types of clubs. But as each improvement is gained, commensurate changes in support are also incumbent on the members of the Branch. The challenge continues to be met by those who serve while traditions continue to grow and earn recognition.}

To keep up their soldier skills members of the platoon are encouraged to take part in different patrols with the Polish or Austrians in the demilitarized zone. However, the camp is in a potential war zone and the Platoon is assigned a defensive zone including a bunker. "Bunker" exercises include first aid training, fire fighting, base defence force skills, sentry skills and voice procedure.

The Gulf War. "During the Gulf War, life at the camp was changed drastically," recalled Captain D. Springford. "For the first couple of weeks in January 1991 travel was not allowed in Israel. Preparations were made for missile attacks which involved preparing for chemical attack. There were refresher NBCW drills and chemical shelters were prepared. The operations centre, officers' mess, theatre and MIR were all sealed with plastic and turned into shelters. For the duration of the war the officers shared a mess with the senior NCO's. Everyone carried his/her gas mask. If we left camp on the Israeli side we also carried chemical suits. All PT ceased for the first four weeks as no running was allowed off the camp. Near the end of the war we were allowed to run off the camp as long as we carried our gas masks. During the course of the war we occupied shelters for 27 hours on 16 different occasions. Shelter occupations usually came in the middle of the night. For the first couple of days everyone was quite nervous. It was hard to decide when to take a shower because if the alarm sounded while you were in the shower it could be quite embarrassing. Once inside the shelter all personnel were accounted for and NDHQ informed. While in the shelter we wore our masks until the All Clear was sounded. Most of the time people would bring books to read or just sleep. We also had TV's in the shelters which would be tuned to British SKY News. We watched a lot of the same footage from CNN as everyone over in Canada."[32,36]

Larose Park. Members of the maintenance platoon were shocked and saddened on 8 May 1993 when Corporal G. Larose suddenly died. He was buried at Hampton, Nova Scotia and his name entered in the EME Branch Honour Roll. His friends in the Golan, remembering that he was an avid sportsman, named their sports field, Larose Park, in his memory.

1974-1994 - Twenty Years Service in the Golan.

10 June 1994 marked a milestone in the history of the United Nations Disengagement Observer Force (UNDOF) in the Golan Heights.[29] For twenty years, contingents from Austria, Canada and Poland,

35. O'Regan, MCpl W.; *EME on Mount Hermon*; unpublished article, 1995.
36. Springford, Capt D.; *The Golan during the Gulf War*: unpublished article, 1992.

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together with UNMO's from UNTSO and our international and local staff, have participated in maintaining the peace in this land of conflict. Contingents from Peru, Iran and Finland have participated part of the time. The UN's collective presence has helped ensure the stability and security of this region since 1974.

Major-General Roman Misztal, UNDOF Force Commander, hosted the first of the 20th Anniversary Parades at Camp Faouar in Syria on 10 June 1994. Representing the Government of Canada was Mr. David Collenette, Minister of National Defence.

The MND fell in love with the maintenance platoon's restored 1955 Dodge truck (Christine), which he proudly test drove. Christine was among the first convoy of vehicles to travel from Cairo to the Golan Heights in 1974.[29]

An added highlight was a visit by Lieutenant-Colonel (Retired) D.K. Porter for the 20th anniversary ceremonies. He gave the Contingent a briefing of his tour as the first Commanding Officer of the Canadian Contingent in the Golan Heights. The briefing included a showing of the film *Camp Roofless*, which had been made from film shot during the original deployment 20 years earlier. As the maintenance platoon scribe noted, "The briefing and Colonel Porter's visit helped to make the occasion, one which we will never forget."[29]

From the initial deployment, EME involvement in UNDOF and in CANLOG has been considerable. Branch personnel also frequently serve in UNDOF Headquarters and have regularly served as the Force Chief Logistics Officer and there is a small three-person workshop in Damascus. The EME component of Canada's UNDOF contribution remains an important element in the success of UNDOF and a source of pride to Canada and to the Branch.

MFO - The Sinai

On 26 March 1979 the Arab Republic of Egypt and the State of Israel signed a peace agreement. This was the culmination of the Camp David Accord sponsored by President Carter of the United States.[37] Three years later, on 25 April 1982, Israel withdrew from the Sinai Peninsula and Egypt resumed sovereignty over the area. On that day the Multinational Force and Observers (MFO) began its peacekeeping mission. The Peace Treaty established four security zones and limited the military forces in these zones. The MFO's tasks include operating checkpoints, reconnaissance patrols, and observation posts. In addition, it verifies the implementation of the treaty provisions, carries out investigations as requested and ensures freedom of navigation in the Strait of Tiran.[38]

To carry out its role the MFO has three infantry battalions to patrol an area 200 by 350 kilometres. Support includes military police and communications units as well as fixed wing and rotary wing aircraft. Minesweepers patrol the strait. Initially the force had a commercial fleet of 900 vehicles and trailers, including 300 prime movers of which there were over 70 types.[39] In 1995 the force's fleet was approximately 500 vehicles and trailers ranging from pickup trucks and forklifts to 40-foot refrigerator trucks and heavy engineering vehicles.[38] In all there are approximately 3,000 military and 300 civilian contractors.

The MFO operates outside of the framework of the United Nations. Canadian participation began on 31 March 1986 when Canada replaced Australia in the provision of a rotary wing aircraft unit and providing eight staff officers to serve in the International Force Headquarters.[39] In 1995 the Canadian contribution was 27 all ranks who worked on the Force Commander's staff.[38]

Initially there was one EME officer on the MFO staff. His appointment was Senior Staff Officer Maintenance. However, as Major R.L.R. Johnson, the incumbent in 1989, noted, "I juggled between roles as the SSO Maint staff officer, medium-sized workshop commander, SSO Supply, SSO Transport, a procurement authority, a design engineer and a general logistician. Life was filled from reveille to midnight with the usual camp and vehicle problems as well as the unusual." In one incident he noted, "The force had instituted a stricter policy towards careless driver faults on vehicles. When a Fijian patrol in a jeep broke down, the Fijian soldiers buried it in the Sinai sands rather than face disciplinary action. However, a Canadian helicopter noticed them burying it and reported the incident. The story of a stolen jeep was quickly proved false!"[39]

37. Cooper, LCol A.; *MFO- Establishment of the Canadian Rotary Wing Aviation Unit*; published in Canadian Defence Quarterly, August 1989; page 37.
38. Andrews, Capt H.C.; *The MFO - A LEME Perspective*; unpublished article, page 1.
39. Johnson, Maj R.L.R.; *SSO Maint MFO Tour 1987/88*; unpublished article, page 2.

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In 1995 there were three EME members on the staff. The OIC Force Maintenance Office was an EME Lieutenant-Colonel responsible for vehicle fleet management and maintenance as well as communications maintenance. The responsibilities of the Staff Officer Vehicle Maintenance, an EME Captain, included repair parts procurement, management of the vehicle maintenance contract as well as vehicle modification and overhaul programs. The Vehicle Technical Inspector, an EME Master Warrant Officer Vehicle Technician, was responsible for quality assurance of contract vehicle repair work. He also conducted vehicle accident investigations and road safety checks.[38]

The force's vehicle fleet was maintained by an on-site commercial contractor or by off-base repair. EME members in the MFO were in constant contact with local people as well as civilian contractors and soldiers from many nations.

"Life in camp in 1989," noted Major Johnson, "was different for each person, rank and nationality. Civilians hired by prime contractors were provided one standard of living. Common labourers and lower ranks were provided a lower standard. Officers and senior ranks fared better. Canadians probably fared best overall. It was my understanding that each nation had to barter for their living conditions and our negotiator did well!"[39]

In 1994 Captain H.C. Andrews noted that "Although the MFO is situated in a harsh desert environment, camp life is reasonably comfortable. Gymnasiums, swimming pools, libraries and movie theatres make life endurable. To live and work in the Sinai gives one an opportunity to experience and observe at first hand a way of life vastly different than ours."[38]

It was indeed engineering with a difference!

UNIIMOG - Iran/Iraq

Operational Outline

The United Nations Iran-Iraq Military Observer Group (UNIIMOG) was established in July 1988 to monitor the cease-fire at the end of the eight-year Iran-Iraq War. Canada provided 15 observers/staff officers for the duration of the mission. During the early months, Canada also contributed 525 troops responsible for setting up and providing communications for the mission along the 1,200-kilometre border between the two countries.[40]

Cross-border communications and movement were prohibited. Consequently two signals squadrons were formed and deployed in late August 1988. They operated independently from one another, one in Iraq and the other in Iran. In Iraq, the UNMOs actively patrolled while, in Iran - because of restrictions on movement - operations were much more static. This difference was reflected in vehicle usage - 250,000 kilometres in Iraq and 50,000 in Iran. The squadron in Iran returned home in late November and the one in Iraq in mid-December.[41]

The UNIIMOG mandate was allowed to lapse in February 1991 - as the Gulf War started.

Planning and Preparation

Planning for the mission started in late July 1988. The Special Service Force Headquarters and Signals Squadron which was located in CFB Petawawa was augmented - doubled in size - to form 88 Canadian Signals Regiment, with two signals squadrons each having a maintenance section. The SSF and HQ Sigs Squadron's 18 maintainers became 45. The ETSM, Master Warrant Officer R.L. Prodaniuk, was to command the maintenance section in Iran. Captain J.Y.L. Turgeon was posted in to command the maintenance troop of 88 Canadian Signals Regiment and the maintenance section in Iraq. Planning was for a tour of from ten to twelve months.

"Things were hectic," recalled Master Warrant Officer Prodaniuk. "NBC and weapons training were a must. Stores had to be loaded into tri-walls and pallets. 100 vehicles and trailers had to be painted and necessary repairs done. Personnel kit had to be prepared and loaded. Everyone worked 7 days a week, 12 to 16 hours per day. I must admit that there were times when I doubted that we would ever be ready on time.

40. DND Backgrounder, BG 94.001 (revised), page 3.
41. Turgeon, Maj J.Y.L.; taped interview with the author, 1995.

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Looking back I can only praise the CFB Petawawa units for their co-operation. The prevailing attitude was, "If the boys need, let's provide" - and they did!

"By mid-August all was ready. Then I noticed apprehension set in as we waited to board the C5 Galaxy aircraft. So with maps and older issues of the National Geographic Magazine we had informal discussions concerning where we would be going and what we would be doing. We flew out of Trenton on August 22nd."[42]

EME in Iran

The first stage of the trip to Iran was a 14-hour flight to the USA base at Ensurklik, Turkey where there was a 24-hour layover. This allowed last-minute shopping at the American PX and a visit to the messes! (Religious laws in Iran forbad alcohol.) Then it was a 6-hour flight on a Canadian CC130 Hercules to Bakhtaran where 88 Canadian Signals Squadron - Iran was to be based. "The flight was uneventful except for the desolation and beauty of the land below," recalled Master Warrant Officer Prodaniuk. "There were countless rolling hills, mountain peaks and chimney smoke from small villages below. We seemed to be in the middle of nowhere!

"Ten minutes out of Bakhtaran the loadmaster gave us instructions on how to combat unload the aircraft. As soon as we landed and started taxiing, we released vehicle hold-downs, drivers got ready in the vehicle cabs and we donned helmets, flak jackets and weapons. As the ramps were lowered, we ran out of the aircraft, vehicles were driven off and pallets were unloaded. The whole procedure took less than 15 minutes. The aircraft, not having shut down, immediately left and another taxied in right behind. It was an impressive scene. After a delay for passport checks we boarded buses for the 5-kilometre drive to our quarters across the city. On the drive there we saw some of the battle damage, the oil refineries in particular, from the war."[42]

The first priority was to deploy the two sector headquarters. Each had a three-man MRT, two vehicle technicians and an FCS Technician, for first-line repairs. From Bakhtaran, Sector South headquarters was located 460 km south in Ahvaz, while Sector North headquarters was located 280 km north in Saqqez. This was followed by the deployment of the four-man signals detachments along the 900-kilometre border with Iraq. The first road moves were difficult, with numerous breakdowns due to engine and transmission overheating and brake fade on the steep mountain roads.

At Bakhtaran, the thirteen EME technicians and one refrigeration technician were responsible for first-line repairs to equipment there and second-line repairs to all Canadian equipment. The Iranians restricted road movement by requiring prior clearances and Iranian escorts for all moves. Therefore a system of two resupply runs per week to sectors was set up. One convoy left Monday for Ahvez and returned on Wednesday. The other left Thursday for Saqqez and returned on Friday. All SEV kits were down-loaded, which made more cargo trucks available - enough for two convoys. While one was on the road the other was being serviced and loaded. "The co-operation between MSE operators and mechanics developed into impressive teamwork," noted Master Warrant Officer Prodaniuk. "That, plus innovation, kept us ahead of problems.[42]

"Living conditions varied widely. Bakhtaran at an elevation of 11,000 feet had beautiful scenery and reasonable weather. Ahvez in the South, however, was in the desert with afternoon temperatures well over 38°C.

"By September it was evident that the UN was proceeding with the installation of its own communications network. Four EME technicians were returned home. One was Sergeant D. Curley who had been sent over to handle local contracts. These were nonexistent in Iran because the Iranians had great difficulty keeping their own equipment going and anything that was available was difficult to procure due to Iranian bureaucracy."

The warning order for the move home was received in the third week of October. Although all the vehicles had been inspected once, it was decided to do the 100 vehicles plus their trailers one more time. This became imperative when it was learned that vehicles would be driven 800 kilometres in two days to the coast and sent home by ship. On November 15th, Master Warrant Officer Prodaniuk was the trail packet commander and started the vehicles in small packets at five minute intervals. He had to explain the reason for this to the Iranians. By the end of the trip he believed that the Iranians even liked the Canadian system.

42. Prodaniuk, Capt R.L.; *EME in Iran*; unpublished taped article, 1992.

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"On the move there was only one major repair required," he recalled. "It was an engine change for a 1¼-ton truck and was done by an MRT during the evening halt. The success of the convoy was proof positive of the work done by the maintainers."

EME in Iraq

Initially the organization was similar to Iran's. There was a headquarters in Baghdad with a dozen technicians for second-line repairs and MRTs. The two sector headquarters each had an MRT with two vehicle technicians and an FCS technician.[43] From Baghdad, Sector South headquarters was located in Basrah, 300 kilometres south, while Sector North headquarters was 200 kilometres north in Sulaymaniyah. It had an out-detachment 100 kilometres farther north at Irbil. Each of these locations had satellite detachments.

"The workshop in Baghdad was set up in a compound behind the UN mission building. A 1¼-ton SEV truck was the control office. Workshop facilities were in modular tents. Overhead cover in the former parking lot area was also used. It had the only paved area. With initially two resupply flights per week from Cyprus, time waiting for parts was low. The scaling done in Petawawa before the deployment had been excellent," recalled Captain Turgeon. "We also received excellent support from Lahr."[41]

Initially repairs were done in situ. However, because of high vehicle usage, long distances and poor roads the technicians were spending too much of their time travelling. "To do a second-line repair in Irbil it would take us a week to get there, do the work and get back to Baghdad," noted Master-Corporal L. Forder. Hence he was sent to augment the Northern Sector technicians. He worked out of Sulaymaniyah, where he was responsible for carrying out repairs on the 30 vehicles there (mainly 1¼-ton SEVs and Iltis jeeps) and heavier repairs backloaded from Irbil. Second-line repairs were backloaded to Baghdad. The rough roads took a heavy toll on tires and the steep hills were hard on brakes. "Whenever a vehicle returned from a patrol," he recalled, "I adjusted the brakes. It was a constant task![44]

"The Canadians in Sulaymaniyah were accommodated in a former hotel which was used as the Iraqi command centre for the area. The building was ringed by a cement wall with barbed wire. There were several light tanks dug in and the area was patrolled by Iraqi soldiers. The Canadians lived and worked on the first two floors. The Iraqi headquarters was above us, and on the roof was an anti-aircraft gun!

"There were two vehicle pits in the courtyard. The Iraqis had been dumping garbage in them. We cleaned them out and erected a modular tent over one. That and a Paul Bunyon for tools and parts was my workshop. I used A-frames for heavy lifts. Axle stands were at a premium so I tried using locally-made cement blocks. These were not very reliable and often crumbled.

"Resupply convoys were once a week so I was often short of critical parts. I often had a vehicle, usually an Iltis, up on cement blocks/axle stands waiting parts. I frequently had to cannibalize a part or two from it to keep the others on the road. These vehicles were critical for the operations as they were used on the patrols.

"In the sector we were initially on hard rations. Then refrigerator units were shipped in to Baghdad. These were stationary units. With a bit of ingenuity, Corporal H. Bransfield, our materials technician, modified them so that they could be put on MLVW trucks. We now had a way of delivering fresh rations to the sectors. First we had one meal a day then all meals. Corporal Bransfield received a Force Commander's Commendation. The cooks deserved one too. For Thanksgiving they cooked us a turkey dinner on Coleman stoves. It certainly buoyed our spirits."[44]

The temperatures throughout Iraq were in the high 30s - like Ahvez. People who worked outside, i.e. most of the maintainers, had to be careful of heat exhaustion and sunstroke. Living accommodation also varied. In Baghdad the troops had comfortable quarters[43] in a former Iraqi rest and recreation centre comprising four huge buildings, each eight to fifteen stories tall and with air-conditioned rooms.[41] In Sulaymaniyah the troops were quartered two to a room. "When the resupply convoys came the drivers bunked in with us, so for a night or two there would be three to a room."[44]

The squadron closed up on December 10th and the vehicles convoyed to Kuwait for shipment home.[43]

43. Penney, Cpl S.J.; unpublished notes, 1992.
44. Forder, M/Cpl L.; taped interview with the author, 1995.

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The Gulf War

A weatherworn EME flag is framed and mounted on the wall near the EME Section of Headquarters Air Command. The inscription reads, "This flag flew over EME Operations in support of the Gulf war from October 1990 until it was lowered on April 1991."[45] It symbolizes EME participation in the Gulf War - "everywhere the action was" - throughout the entire period of Canadian operations.

Operational Outline

Iraq invaded Kuwait on 2 August 1990. Four days later the United Nations Security Council unanimously approved Resolution 661 imposing economic sanctions on Iraq. On August 10th, Canada announced that it would contribute a task force of two destroyers and a supply ship to the multinational effort in the Persian Gulf. The ships underwent intense modifications to prepare them for this mission. Two weeks later they sailed for the Gulf and arrived in Bahrain on September 27th.[46]

Canada announced on September 14th that it would send a CF18 squadron to the Gulf to provide air cover for the Canadian ships and to augment the multinational air resources already in place. The squadron deployed on October 6th.

The deployment of an air squadron in addition to the task force, as well as army units such as security forces, engineering and supply technicians, required a one-channel Canadian command in the Gulf. At the same time, National Defence Headquarters was being realigned into a Joint Staff (JSTAFF) configuration. (It should be noted that the actual preparations were assigned to commands; the naval task force to Maritime Command (MARCOM), the first CF18 squadron to Canadian Forces Europe (CFE), the 1 Canadian Field Surgical Hospital (1CFSH) to Land Forces Command (LFC), 90 Signals Regiment to Canadian Forces Training System (CFTS) and the second CF18 squadron to Air Command (AIRCOM).[47]

On October 27th the deployment of the equipment and personnel for a Canadian Forces Joint Force Headquarters was completed. On November 6th, the commander of the Naval Task Force, Commodore K.J. Summers, assumed command of the Canadian Forces Middle East.[48]

On 19 October 1990, the Canadian Embassy in Kuwait suspended operations and its diplomatic staff withdrew to Baghdad and left Iraq three months later. On 11 January 1991, Canada sent a second CF18 squadron and a Boeing 707 refueller to the Gulf. On 16 January 1991 Canada started to deploy the 1st Canadian Field Hospital to Saudi Arabia to assist British ground forces.

The ground war, Desert Storm, began on 23 February 1991. Three days later Kuwait City was retaken and on the 28th, military operations were suspended. The next day the Canadian Embassy in Kuwait City was reopened. On March 2nd Iraq accepted United Nations Resolution 686 which contained the cease-fire conditions. Canadian service people were back home by early April.

Approximately 4,000 Canadian Forces personnel served in the Gulf War. Approximately 2,000 more in Germany and Canada were involved in direct support of the war effort.[49] From the beginning of their deployment in August 1990 to the end of hostilities in March 1991, a maximum of 2,500 personnel was in-theatre at any one time. Of these, approximately 75 were Canadian Craftsmen - and they served everywhere.

On the Airfield

Preparation and Support. During the latter half of August 1990, HQ CFE received a steady stream of questions from NDHQ about sending and maintaining a CF18 squadron under desert conditions. On 29 August 1990, the SO2 Maintenance HQ CFE, Major J.A. McDonald, and his staff started contingency planning for such an event. Two weeks later this foresight paid off when it was decided to send a CF18 squadron from CFE to Qatar.

The SO2 Maintenance office and staff were quickly transformed into a J4 Maintenance staff cell and

45. *The Gulf War Flag*; list of those in the photo, 1993.
46. Miller, Cmdre D.E.; *The Persian Excursion - The Canadian Navy in the Gulf War*; The Canadian Peacekeeping press and the Canadian Institute of Strategic Studies, 1995, pages 230-32.
47. McDonald, Maj J.A.; interview with the author, 1991.
48. The JSTAFF concept used plans formulated around typical continental command and control structure for CANUS and NATO operations. (See Miller, op.cit., page 84.)
49. DND Backgrounder, BG 94.001 (revised), page 3.

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preparations started in earnest. Because 4 CBMG was in the midst of planning and conducting its annual FALLEX exercise, its maintenance staff and units were not available to help. What were available were the base maintenance staffs and workshops of CFBs Baden and Lahr, 4 Air Defence Workshop and the Forward Maintenance Support Unit (FMSU). What followed was a nonstop 60 days of 18-hour days for the J4 staff and overtime for the workshops.[47] In CFB Lahr the members of the ancillary and vehicle platoons of Base Maintenance (Land) provided 2,300 hours of direct labour and 1,200 hours of overtime in a four-week period. Their work included modification of 3,000 C7 magazines, sanding and painting 80 vehicles, repair and final inspection of 100 vehicles and trailers and manufacturing a number of propane stoves.[50]

Captain C.A. Moore on the J4 Maintenance staff did his daily shift as a duty officer plus his SO3 Maintenance job, which at this point entailed researching and developing ways to facilitate the maintenance of equipment in desert conditions. By the time the CFE administrative order for the operation was published, the maintenance staff had already distributed a draft CFE EME Instruction (CFEEMEI), Preparation of Equipment for a Desert Environment. The J4 staff had consulted widely for ideas, including the staff of the NATO central pipeline system. For example, the cabs of vehicles were painted a light sand colour. This, as a USAF consultant noted, would reduce the interior temperature by several degrees. A special desert parts kit including two weeks supply of parts and filters was put in each vehicle. "This worked well except that for the refuellers, the package was so big there was hardly any room for the driver!" recalled Major McDonald.

The mood in the workshops was very positive. Many technicians suggested good ideas as they worked. Many good ones were implemented. It was calculated that the inspections and preparations would have normally taken three weeks but only a week-and-a-half was available. It was completed in just one week. This was accomplished in the face of many changes since support preparation was proceeding in tandem with operational planning. The attitude on the shop floor was 'No matter how many times it changes, we'll do it.' Many of the technicians were putting cookies and toilet paper and other handy sundries in the special desert parts kits to make life a little easier for those who went to Qatar."[51]

"An important part of planning was to check the air transport flow in order to see who and what were staging through CFE, obtain allocation of space for shipping to Qatar and, most importantly, to provide assistance to EME members going to the Gulf. In January when the advance party of the 1 Field Surgical Hospital (1FSH) was staging through, we met Master Warrant Officer D.G. Stephansson and gave him a package of telephone contact numbers and special fax sheets for requests to us. Later when Major G.P. McNeil, the Officer Commanding the Services Company of the 1FSH, passed through he noted that he was missing a special gas coupling for his equipment. During his brief stopover he defined the coupling. A sample was made, photographed and a copy faxed to him in Qatar the next day, Thursday. He faxed approval and on Saturday we sent him 20 which had been made in the CFB Lahr workshop."[47]

EME Operations. "Even in October, the heat was like a fist in the face as you stepped off the ramp of the aircraft. It was a great shock to the system," recalled Corporal B. Demary. "I wasn't the first EME person to arrive; Master-Corporal J. Deroches had arrived the day before." Warrant Officer W. Palmer had arrived first on October 5th and raised an EME flag over what was to become EME Workshop Qatar.[52] "They were already hard at work, repairing vehicles the Qatar army had loaned to our MSE Operators to move equipment off the airhead. After securing our accommodations at the Camp we set out to begin building our new workshop, which became unofficially known as the 1st of the 90th Royal Canadian Electrical and Mechanical Engineers, Doha, Qatar."[53]

The Canadians occupied two areas in Qatar. Canada Dry 1 (CD1)[54] was situated a short distance from the airport and housed operations, signals and all administrative support elements including the EME Workshop. It was so crowded that the Canadian commander decided to acquire an area adjacent to the airfield for some flight line operations. This was called Canada Dry 2 (CD2) and was located to the south of the main buildings.

"Our EME Workshop in Qatar was located at the northeast end of CD1," noted Warrant Officer G.J. Scott. "Although the majority of our work was conducted at CD2 our place of residence was at CD1.

50. Flight, Lt S.J.; *EME Support to OP Scimitar*; EME Journal, Summer 1991.
51. Holt, Col P.J. and Scott, WO G.J.; taped interview with the author, 1992.
52. Palmer, WO W.; telephone conversation with the author, 1995.
53. Demary, Cpl B.; unpublished notes on experiences in the Gulf War; 1992.
54. The nickname was Canada Dry 1 (no booze).

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The work area consisted of two long hard-standing bays sandwiched between supply and CE. It was barely adequate although it was partially covered from the elements and was equipped with a small pit. For a short deployment it was workable. Through renegotiation we did expand our work area."[55] Corporal M. Truscott recalled that "Being located between the engineers and supply created difficult working conditions. The engineers had put in a barbed wire fence around their area. Supply had put up six sections of modular tent and storage racks in the maintenance compound. We were left with two bays and a wide driveway and half the time we couldn't get in because supply had blocked off the driveway."[56]

Of the 700 Canadian Forces personnel in Qatar, 11 were EME. Initially they operated in three distinct groups; seven in the EME Workshop, two with the infantry company and two with the MLBU. Later they all came under the technical and administrative control of the Warrant Officer in the EME Workshop.[55]

"About half of the vehicles in theatre were rented," noted Warrant Officer Scott. "We were kept busy inspecting them before they went to contract repair and re-inspecting them when they returned to ascertain whether or not they were repaired properly. We were also responsible for 10 MLVWs or 3-ton trucks, 11 1¼-tons - one of which had a firefighting kit, 4 AVGP Grizzlies, 12 trailers - several of which had MLBU or other SEV kits, and 22 pieces of AGSE - including ten MJ-1A bomb loaders, a K-25 aircraft loader and six International Refuellers.

"We had a standing offer with a tire repair facility. They were able to fill our needs except for AVGP tires which were sent to either CFE or to Cyprus. The AVGPs were used continuously as patrol vehicles. They had arrived in deplorable condition. The wiring in the turrets of three of them had to be replaced due to electrical fires and the tread on most tires was below safe wear limits. There was a horrendous amount of barbed wire littered over the area. Brake line procurement and replacement was also an ongoing problem.

"Very quickly it became quite clear that there existed two types of IOR parts. Those for the Air Force seemed to arrive without any delay. Ours were bypassed more than once. At one time waiting for parts kept the K-25 loader out of action thus directly hindering air operations. After hastening a number of times, I called Lahr and asked someone to go to the AMU and look and see whether or not my parts were there. They were, and Master Warrant Officer B. Maddin personally saw to it that the parts were loaded on the next available aircraft."

A necessity in the hot climate of the Gulf was the Mobile Laundry and Bath Unit (MLBU). The area assigned to the MLBU had been a POL storage area. 45-gallon drums were stacked four high and 50-feet deep when the first 11-man MLBU crew arrived. The crew, which included Master-Corporal R. Wright and Master-Corporal M.F.V. Hofstater, worked for two days to clear the area for their two MLBU units. The unit from Germany was in excellent condition and was quickly set up and put into use.

The second unit, however, was a different story. It had come from Petawawa, had been deployed to Oka and had been stripped completely for repairs. (It was later learned that a Paul Bunyon of parts for this unit were stopped in Germany rather than being sent on to the Gulf.) Working with the airfield maintenance section, Master-Corporal Wright managed to scrounge hose and fittings to operate the generator and burn unit. For other parts he went on an LPO run to the oil rigging companies and got heavy piping and sealer. He even made a gear for a drive unit! Once fired up he discovered a hole in the combustion chamber which he fixed with some metal and sealer. Finally the unit was operating.[57]

"Base Maintenance (Land) in CFB Lahr cannibalized one of their MLBUs to keep our machines operational," noted Warrant Officer Scott. "Throughout this operation we worked closely with SO2 Maint in CFE, We were in touch with them daily by telephone. Thanks to a lot of EME personnel in Cyprus and CFE, Captain Moore in particular, we were able to keep our equipment operational."

The infantry company tasked with defence of the Canadian units on the airfield was located at CD1. Its FCS Technician, Corporal V.G.J. Steele, was awarded a Chief of the Defence Staff Commendation for his hard work in keeping generators going and setting up wiring. At one point he was so overloaded with work that the EME workshop was tasked to help him.[55]

A Craftsman's Life. "The climate is very hot 11 months of the year, the other month is very warm," recalled Warrant Officer Scott. "With the first group to arrive, painted murals of favourite scenes

55. Scott, WO G.J.; *EME Workshop Qatar*; unpublished report, 1992.
56. Truscott, Cpl M.; *Gulf Report*; unpublished article, 1992.
57. Wright, Sgt R.; unpublished notes on the MLBU at Qatar, 1995.

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began to appear in the quarters, as well everyone learned how to properly fill sand bags for the hundred-and-one locations. Sand bagging was to become a common sight, each section was given a quota to fill. Ours was 600. Normally this was accomplished in the early morning or late evening.

"Early in the morning of January 17th the war began. Numerous air attack warnings marked the first two weeks of the war and succeeded in destroying any semblance of a good night's sleep. The beep beep of the PA system never failed to draw the immediate attention to the announcement to follow, and was responsible for more than a few missed heartbeats. We were in our gas suits so much that there was a rumour that the dress of the day was to be *TOP HIGH*. The evening routine for bed was: shower (respirator close), dress in combats and suit-up to *TOP MEDIUM*, lie on your bunk with respirator beside your pillow.

"The main threat to the Canadian forces in Qatar was terrorist attack! Canadians had to prepare for any and all possibilities. The PLO was known to have support in the local Palestinian community. When war did break out, the threat of PLO action against western targets became increasingly real. Iraqi sympathizers existed but their numbers and training were difficult to ascertain. The result was an extremely detailed and well-planned security system. The Canadian commander took precautions so that what happened to the US Marines in Beirut would not happen to us! However, our weapons were locked up a distance from our work place and our ammunition was stored in another place. If there had been an attack we would have had difficulty in defending ourselves, particularly if we were working in CD2."[55,56]

The R22eR manned watch towers at each corner of the compound and a strong defensive position at the main gate. "My duties (outside of work) took place mostly in the evening," noted Corporal R. Johnson. "I was on guard duty with the R22eR from 1900 hours to 0700 hour daily, when the war started, as part of F Platoon.[58] I assisted in setting up claymore mines and became more familiar with chemical detection equipment. As part of F Platoon, my personal weapon was kept in storage with the R22eR and I was issued five mags of ammunition to carry while on duty.

"On the average, one day a week was allotted for time off, although it wasn't always possible to accommodate everyone. I felt a respected member of a team that depended on each other daily. I met a lot of people and made many new friendships that I am sure will last a lifetime."[59]

In the Field Hospital

Preparation and Support. As 1990 closed the field hospital in Petawawa was growing from its peacetime strength of 36 to its wartime strength - and then doubling in preparation for operations in the Gulf as 1 Canadian Field Surgical Hospital (1CFSH). It included a company of infantry from the Royal Canadian Regiment located in London, Ontario. It was to have a services company of 173 which included a maintenance platoon of 53. "It was brand new and twice as big as anything that had been thought of before," recalled Major G.P. McNeil. "Equipment and personnel came from units on base and from other bases. Some equipment was specially-purchased or developed."[60]

For example, LETE was tasked to produce a Medical Unit Self-contained Transportable (MUST) hospital tent that was easily set up and taken down and met desert environment conditions. It was required in a month. "We assembled it in a building in Connaught Ranges," recalled Master Warrant Officer G. Possum. "We then simulated various temperatures with forced air. Then we took it down and reassembled it at the LETE test grounds to prove that it was portable. We did all this in two weeks using local resources around Ottawa and met our tasking commitment."[61]

There was no SOP for hospital launching. In early January 1991, 2 Service Battalion was tasked to prepare equipment. Equipment poured in and Base Supply was swamped. There was an overriding time constraint. The ship departure time in Halifax dictated the train time, which in turn dictated when stores and equipment had to be shipped from camp - which was before augmentees could match up with their equipment! To compound the problem, anyone who thought of something that 1CFSH would need added it the list and it all arrived at Base Supply - in no particular order. There was no time for sorting or consolidation. Vehicles and 58 sea containers were loaded as stores arrived - and with no manifest lists![60]

Two Advanced Surgical Teams were sent early - without support equipment or personnel. The main

58. An extra platoon made up Support personnel and used during emergencies.
59. Johnson, Cpl R.; *Gulf Tasking*; unpublished article, 1992.
60. McNeil, Maj G.P.; taped interview with the author, 1992.
61. Possum, WO G.; taped interview with the author, 1995.

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body was sent by ship and aircraft and was consolidated at a camp in Al Jubyl. Everything was done in a hurry. "On January 17th I was watching a Scud missile landing in Israel on TV when I got a telephone call that I was going to the Gulf," recalled Sergeant J.G. Alexander. "That weekend I went to Petawawa for desert warfare training. It was about -35°. We went to the range and the gas hut. On January 27th, Superbowl Sunday, we went to Trenton, watched the game and five hours later I was on a Herc heading East (as part of the advance party). We landed in Al Jabyl, Saudi Arabia at about 1500 hours on 29 January 1991."[62]

EME Operations. As soon as they landed in Al Jubyl, the two advanced surgical teams were sent forward to the Al Quaysumah area, 500 kilometres northwest along the Pipeline Road, and attached to 22 British Desert Field Hospital. In addition, an advance party was sent forward to this area to prepare a camp for 1CFSH.

The forward area assigned to 1 CFSH was about three kilometres from the desert hospital. British engineers built a berm 1,000 metres by 600 metres. "It was far too large," noted Warrant Officer K.S. Melbourne who, as soon as he had landed as part of the 1CFSH advance party, went forward to set up the area. "We took the medium Fritsche shelter, which was to become our maintenance mobile workshop. We set it up as soon as we arrived and for a few days had our EME flag flying from it."[63]

"This was the period of the final buildup and troop movements just prior to Desert Storm being launched," recalled Lieutenant W.P. Proteau. "Road space on the MSR (the Pipeline Road) was at a premium. It was a solid stream of vehicles. You were given a five-minute window to get on the road. If you missed your window, you were stopped by American MPs armed with .50-calibre machine guns! They were moving whole divisions and corps. You would be lucky to get back on within three days! We made our timings. I was sent up to be the maintenance officer in the forward location, but ended up being the only officer with any knowledge of logistics. I had to put my Phase Four Course knowledge to work right away!"

"The advanced surgical teams had little support. The British could do little to help them as they had been told that we would be self-sufficient for first- and most second-line support. It was frustrating; some of the sea containers were arriving and there were no manifest lists. All we could do was tear them open and use what we found."[64]

As the main body landed, equipment was piling up on the dock at Al Jubyl. At the same time the move forward to Al Quaysumah began. 1CFSH never did fully deploy. A week later, when the main body was supposed to move forward, the war ended. The advance party which had completed the setup waited a couple of days and then were ordered to take it all down and return to Al Jubyl.

"The camp at Al Jubyl consisted of some barracks, a kitchen, a very small warehouse and some office space," noted Major McNeil. "The maintenance platoon had its control office in the office space. Its workshop SEV vehicles were set up outside and the technicians worked from them. We got some parts out of sea containers and went to work. The task vehicles of the transport platoon were busy moving stores, first to the forward location then back to Al Jubyl. Any broken-down vehicle was just pushed off the MSR. We set up a system in which each truck was serviced after each trip and filters changed, etc."[60]

During the preparation period there had been liaison between CFE and Petawawa so that the experience of deploying the Canadian Support Unit to Qatar could be of assistance to 1 CFSH planners. Consequently, as part of vehicle preparation, desert parts kits similar to those provided by CFE for the vehicles going to the airfield (see page 154) had been put in the cabs. Unbeknownst to 1CFSH, these kits were removed by the DAGs because they weren't part of the EIS![47] This was caused by a lack of communication due to the rush to deploy the unit. But it denied the technicians on the ground an immediate source of parts - which they sorely needed.

A Craftsman's Life. The short stay in Saudi Arabia brought the reality of war to many Craftsmen. "One morning at 0200 as a group of us was getting up to unload a Herc, we heard a faint siren in the background," recalled Sergeant Alexander. "I said that it was a Scud attack. My roommate said no. Then there was a loud explosion and the windows rattled. The whole place shook. Instantly everyone went *TOP HIGH*. We were in a war zone."[62]

62. Alexander, Sgt J.G.; taped interview with Maj K. Horton, 1992.
63. Melbourne, WO K.S.; taped interview with the author, 1992.
64. Proteau, Capt W.P.; taped notes, 1993.

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Onboard the Ships

Preparation and Support. As preparations for the ships began in early August 1990, Master-Corporal R.A. Vallières was sent to Halifax to help train naval personnel in the use of small arms, including C7s, 0.50-calibre machine guns, Javelin anti-aircraft missiles and 40mm Boffins.[65]

During this two-week period many weapon systems had to be mounted on the three ships. Six 40mm Boffins[66] were to be mounted, two per ship, one for each side. They had been in storage in CFE.[67] When the decision was made to use them, CFE had them modified in Gibraltar to use new quick-change barrels. CFE, having designed a method of breaking the guns into four pieces for easy shipment, sent them by air to Halifax.[47] Depreserving and setting them up for operation was also the task of Master-Corporal Vallières.

Throughout this period EME Workshop Halifax was fully tasked in helping to prepare the ships for the Gulf. Also included in their work was preparation of equipment for what was to become Canadian Forces Joint Headquarters in Bahrain. When the ships left Halifax harbour on August 24th, crowds gathered dockside to wish the task force well. The members of the workshop proudly took their place alongside workers of other dockyard units as full contributors to the preparations of the task force.

EME Operations. "The Army supplied air defence forces for the ships."[68] These forces included two EME technicians per ship. The weapons technician was responsible for the 40mm Boffin and other small arms while the FCS technician was responsible for the Javelin anti-aircraft missile. "My main task on board HMCS Protecteur, the resupply ship, was training the naval crews on the Boffin. We even had a few live firing drills, but this was during slack times because we were in a war zone![65]

Embassies - Headquarters - Divisions

EME personnel served in several other places during this operation, including the Canadian embassy in Kuwait City, Canadian Contingent Headquarters in Bahrain and with the 1 British Armoured Division.

Canadian Embassy. After the war was over, the Canadian embassy in Kuwait City was reopened. Support for the opening was provided by 1CFSH. To restore and set up the embassy building, a convoy was sent with generators, building supplies, office material and the tradesmen to do the work. One of them, Master-Corporal J.A.S. Laveault, was put in charge of power generation at the embassy and was part of the guard for the Canadian ambassador.[69]

Canadian Forces Joint Headquarters. "Our departure time was not given to us until almost the very last minute for security reasons, which was quite hard on the families of those going," recalled Corporal J.E. Martin, a member of 90 Headquarters Signals Squadron which provided the communications for the Canadian Forces Joint Headquarters. "My job there was to maintain the generators (10kW, 30kW and 85kW) and the SMP vehicles, although I was very limited in what I was allowed to do on vehicles because of the rental agreement.[70] It came down to checking and diagnosing problems, which did manage to reduce downtime.

"I also got tasked as an ambulance driver for a convoy that went to Kuwait City to deliver food and water to the Canadian embassy. While I was there I helped repair some of the embassy vehicles and with the unloading of the ship that transported the field hospital to Saudi Arabia.

"An EGS Master/Corporal and I set up our own mini-CE Section. We had some unusual tasks such as wiring the buildings for 110-Volt, 50 and 60 cycle power. We used a large transformer and voltage regulators to convert 430-Volt 50-cycle local power to 110-Volt 50-cycle power. We included a backup generator system in case of a local power failure. We also did light construction work such as building and renovating offices and constructing serving counters. We were also the unit welders. We built such things as 1,000-litre fuel tanks for the generators and ladders for the gun positions on the roof." Each received a commendation from the commanding officer.

65. Vallières, M/Cpl R.A., interview with Maj K. Horton, 1992.

66. Boffins are the naval mounts of the 40mm Bofors anti-aircraft gun.

67. There was a rumour that some of these guns came from museums. It is not true. They were naval mounts called "Boffins" which had been used on the HMCS Bonaventure. When the "Bonny" was decommissioned in 1970, they were sent to Germany and used for low-level air field defence. On the introduction of new anti-aircraft systems in the 1980s they were put in storage. (See Miller, Cmdre D.E., op.cit., page 29).

68. Miller, Cmdre E., op.cit., page 84.

69. Laveault Cplc G.A.S.; taped interview with the author, 1995.

70. Vehicles for the Headquarters were rented locally.

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"Our living conditions were far better than we had expected; we stayed in one and two-bedroom apartments which we shared with two to three people. There was a laundry service, air conditioning, a full kitchen in every apartment, close circuit TV channels and a view of the Iraqi embassy 40 feet from my bedroom window! We were all issued personal weapons and during the embargo these remained in the CQ under lock and key. As soon as hostilities broke out, we carried our weapons with loaded mags everywhere we went. We also carried 250 rounds of ammunition. After the first 6 or 7 weeks of working 15 hours a day, 7 days a week, we were given one day off a week if work allowed."[71]

1 British Armoured Division. When the United Kingdom decided to send 1 British Armoured Division to the Gulf, four EME officers were on exchange in the British Army of the Rhine (BAOR). They went to the Gulf with their units and served there with them throughout the war. Lieutenants R.A. Brooks, A.D.W. Dalziel and M.J. Landry were awarded the British Gulf War Medal. Lieutenant M.J. Gallinger's time in theatre was a few days short of qualifying.

Summary - "EME was everywhere the action was"

Throughout the entire period of Canadian operations in the Gulf, Canada's Craftsmen served in many places and in many new and different situations. To land, air and sea commanders they revealed their adaptability and their innovativeness. In so doing they reflected well their training as soldier-technicians, the way they work (by skill and by fighting), their teamwork, their esprit de corps and, above all, their value in keeping equipment ready for operations. It is why, as Corporal B. Demary noted after the war, "EME was everywhere the action was."[72]

The fog of war was closely experienced and aptly expressed by Lieutenant Proteau at Al Quaysumah, 60 miles from the Iraqi-Kuwaiti-Saudi border. "We didn't get much information on the progress of the war, but I noticed that the British armoured brigade in front of us was calling for POL only. So I assumed that all was going well. I usually got up each morning to watch the sun rise. One day it didn't come up. Everything was pitch black, but there were little oily black flakes falling from the sky. At noon it was still dark. Then the wind shifted and we realized that we had been in smoke all morning - the Iraqis had set fire to the oil wells just north of us!" It was a legacy that bothered many Canadians as they went home from the Gulf and had to be dealt with by a new group who arrived to set up the truce observer posts for UNIKOM.

UNIKOM - Kuwait

The United Nations Iraq/Kuwait Observer Mission (UNIKOM) was established in April 1991 at the end of the Gulf War. Its purpose included monitoring a 300-kilometre long Demilitarized Zone (DMZ) which extended ten kilometres into Iraq and five kilometres into Kuwait along the 1963 internationally-recognized boundary. The mission was also to deter violations of the boundary and observe any hostile or potentially hostile action mounted from the territory of one state or the other.[73]

UNIKOM initially included a force headquarters, 300 observers from 33 different nations, an aviation element, a logistics support unit, a medical unit, an infantry security component of five rifle companies from existing UN missions, and an engineering unit provided by Canada.

Initial Deployment - A Combat Engineer Regiment

The Canadian engineering unit was based on 1 Canadian Engineer Regiment (1CER), augmented with additional combat service support personnel and construction engineering tradesmen. The unit deployed in the latter part of April 1991.

The priority tasks of 1CER included; route clearance to OPs and Sector HQs; a patrol route through the DMZ parallel to the international boundary; clearance of areas and construction of force and sector head-quarters; clearance of additional routes to enable UNIKOM to patrol the length and breadth of the DMZ; providing general engineer support including water purification; and always being prepared to defend a sector

71. Martin, Cpl J.E.; *Bahrain*; unpublished article, 1992.
72. Demary, Cpl B.; conversation with the author, 1992.
73. MacLean, Capt H.D.; *UNIKOM - 1991, the Black Lung Tour*; unpublished article, 1991.

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of the DMZ.

Lieutenant K.J. Lacey was the planning officer from June to September. The squadron's main tasks were to keep the routes open in the DMZ and to renovate a former Iraqi hospital building as the force headquarters. "Local building supplies were in short supply, so we got most of materiel from Germany with long lead times," he recalled. "Planning was a critical function. It was a good experience. I was also able to look at maintenance from an operator's point of view. It gave me a better appreciation of what the technicians do."[74]

Maintenance Troop. The 36-person maintenance troop of 1CER was to be self-sufficient for level one, and limited level two, maintenance for Canadian-specific equipment and, to the extent possible, for UN-provided equipment. It was also to be self-sufficient for level one recovery. Initially there was no recovery support beyond the unit. The troop maintained a wide variety of equipment. Canadian-provided equipment included mainly ancillary equipment and one 1¼-ton CUCV for the national rear link. UN-provided equipment included a mixed bag of 97 prime movers, 8 trailers and miscellaneous generators.[73]

The troop was assigned the back third of a large warehouse for its workshop and living area. The advance party of Master-Warrant-Officer C. Shrader, Sergeant F. Meijerink and Corporal G. Samson arrived on 22 April 91 and spent a week cleaning up the warehouse and setting up a workshop. The remainder of the Troop arrived a week later. After departing Chilliwack in an overcast drizzling rain and a temperature of 10°C, the heat experienced deplaning at Kuwait International Airport was like walking into a blast furnace. The temperature was 40°C! In addition, the burned out tanks, APCs, SP artillery and other vehicles strewn all over - particularly along the main road north from Kuwait City toward Iraq - made this *The Highway to Hell*.

The regiment had deployed to Kuwait with minimum Canadian equipment and was initially given hand-me-downs from the coalition forces. These included 41 US CUCVs and 25 German MANs. In addition, there were vehicles and heavy equipment from a variety of other countries, e.g. Czechoslovakian TATRA trucks, a USSR refueler, three USSR tracked bulldozers, two German Zettlemeyer ZD 3000F wheeled bulldozers, two Unimog Mercedes ambulances and four Japanese Hino refrigeration trucks.

"This was all unfamiliar equipment and to make matters worse there were no operator's, parts or maintenance manuals," recalled Captain H.D. MacLean, the maintenance troop commander. "However, through the special efforts of Captain C.A. Moore, the SO Vehicles at HQ CFE, we were able to get usable manuals for most of the US and German equipment within a month or so. In addition, he was able to provide contact names, addresses and phone numbers for as many dealers as possible in theatre. Even with the manuals, parts remained a problem and our success depended primarily on the resourcefulness of the tradesmen."

"The master scroungers of 1CER, however, have to be the mechanics," noted the Chilliwack Progress. "Where do you find a steering pump for a Czech refueller? How does one locate air filters for Russian Bulldozers? Generally, you don't. You make do. You nurse, cajole, coax, pamper and urge machines to last six months. Behind the shop is the truck graveyard of 11 vehicle carcasses being pillaged for transmissions, windshields etc." As Warrant Officer R. Young noted, "The graveyard is getting bigger and the stock of 'parts vehicles' is steadily shrinking."[75]

An example of the resourcefulness of maintenance troop personnel took place on 8 June 1991. The engine of a Mercedes Unimog ambulance had failed. Since the mission had just barely started, no replacement was available through the supply system. However, it was felt that the *Highway to Hell* had an ample supply of "spares" available in the desert.

A reconnaissance by Sergeant A. Ruelle near the Bubdyan Island bridge indicated several candidates. After carefully scrutinizing the area from the road for rockeyes or other signs of unexploded ordnance, a close inspection revealed an Iraqi Unimog cargo with no apparent battle damage. A visual check of the engine installation and condition showed great promise.

"We dispatched the wrecker and an MRT to remove what was required," he recalled. "Corporals T. Hussey, P. Guy and G. Brohart and myself were well into the task when out from nowhere appeared a US Blackhawk helicopter. It commenced to execute very low circuits around us. At first I thought that we were caught with our fingers in the cookie jar, but they waved off and probably marvelled at good old Canadian

74. Lacey, Capt K.; Experiences in UNIKOM & UNPROFOR; taped interview with the author, 1994.
75. *Pillaging Parts, seeking supplies*; The Chilliwack Progress, 21 August 1991, page C9.

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ingenuity. When we got back to the workshop to install the 'new' engine some minor modifications had to be made. As far as I know we now had the only turbo-charged Unimog ambulance!"

Sometimes resourcefulness did not pay off so well! When it deployed to Kuwait the maintenance troop did not have an electric welder. This was important because without it the troop's materials technician, Corporal F. Litchfield, could not have fixed the engineering equipment that was damaged or worn in mine clearance and construction - and that would have affected the regiment's operations. "We found a damaged one and checked it all over," recalled Corporal D.B. Remus, "then we jury-rigged it by putting on an alternator from an American 1¼-ton and making up welding cables from battery cables. It wasn't the best but it was something - and it worked."[76] Later, when a UN survey team came by to check equipment requirements, the maintenance troop's request for a proper welder prompted the Survey Team's reply, "You already have one!" Nevertheless, a new UN-purchased welder arrived after a month-and-a-half.[76]

Follow-on Deployments - a Combat Engineer Squadron

By the time of the second rotation much of the work had been done to set up the observer posts and sector headquarters in the DMZ. Engineer support focused on maintaining this infrastructure and on mine clearance in the DMZ. Consequently, the Canadian contribution was reduced to a combat engineer squadron of 85 all ranks. The first unit filling this new role was 59e Escadron du génie de combat. Included in the squadron was a maintenance section of seven technicians headed by Master-Corporal G. St-Amant.[77] The squadron's administrative officer was an EME officer, Captain N. Eldaoud. "It was an excellent opportunity to gain broad experience," he noted. "On November 6th just after we arrived, the last of the 732 oil fires set by the retreating Iraqis six months before was extinguished. We looked forward to seeing the sun again. The fires and destruction all around made us appreciate Canada all the more. The squadron showed that by literally reconstructing an old hospital for the local population."[78]

76. Remus, Cpl D.B.; taped interview with the author, 1992.
77. 59e Escadron du génie de combat; *Irak-Koweit - Oct 91 à Avril 92*; souvenir book, 1992.
78. Ouellet, Danielle; *Les Soldats de la Profession*; Plan - le Mensuel du Genie Québécois, Avril 1992, page 18.

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11

Chapter 11 - THE FORMER REPUBLIC OF YUGOSLAVIA

The ECMM-monitoring a war, UNPROFOR-providing humanitarian Aid

Marshall Tito's death in 1980 marked the end of an era in the former Republic of Yugoslavia. Forced into a confederacy not of their liking at the end of World War Two, the former Balkan nations had yearned for independence. As the confederacy was being dismantled, the simmering centuries-old problem - enclaves of one nationality within the territory of another - boiled over and plunged the region into the abyss of internecine genocide.

It hadn't started out that way. After the signing of the Brioni Agreement, the European Community Monitoring Mission (ECMM) was created July 1991 to monitor the withdrawal of the Army of Yugoslavia from Slovenia and Croatia. Its efforts, however, quickly expanded into the prevention of hostilities. In the fall of 1991 the ECMM commenced operations in Bosnia-Herçegovina. It operated alone until the deployment of UNPROFOR commenced in early 1992. Canadian soldiers were part of the initial deployment of UN soldiers into the former Republic of Yugoslavia. As UNPROFOR grew and its role expanded, the ECMM adapted to the new situation by switching its focus from peacekeeping to that of political, military, economic, and humanitarian monitoring.[1]

For four years the violence and bloodshed in the former Republic of Yugoslavia captured the world's attention. At times it seemed as if no one could stop it. On several occasions Canadian soldiers were taken hostage by the warring sides, highlighting how powerless the UN was, at times, to protect its own troops.

"Canada's mission to the former Yugoslavia ranks as one of the more demanding of the country's peacekeeping honour roll. It stretched the army to the point of exhaustion as soldiers were given little time to rest at home before returning for yet another tour in Bosnia-Herçegovina or Croatia. It was also one of Canada's riskiest peacekeeping operations. Dozens of medals and citations were awarded for courage and acts of bravery under fire."[2]

The ECMM - monitoring a war

The European Community Monitoring Mission (ECMM) was the first international peacekeeping or monitoring organization to operate in the former Republic of Yugoslavia. Over the next two years the mission expanded from Croatia and Bosnia-Herçegovina to include monitoring the spillover effects in the surrounding countries. It established regional centres and teams in Hungary, Bulgaria, Albania and the former Yugoslav Republic of Montenegro. The teams met with local authorities, refugees, businessmen and regular citizens to develop an overview of the effect of the wars on the area. In addition, the ECMM monitored the no-fly zone over Bosnia.

The Mission was a mix of diplomats and military officers headed by an ambassador. Its headquarters had a military staff plus a political section. Regional centres sent daily reports to the headquarters in Zagreb. The Mission sent a daily report to European capitals. Much effort was spent in coordinating with UNPROFOR and other international political and humanitarian organisations in the region.

Canadians served with the mission since its inception. Canada used this commitment to reassure its

1. Gillespie, Col R.A.; *European Community Monitoring Mission*; unpublished article, 1995.
2. Pugliese, David; *Dangerous duty draws to a close*; Ottawa Citizen, 6 October 1995; 503.

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NATO allies that although it was withdrawing its forces from Europe, it was still interested in playing an active role in ensuring NATO stability. Up to 15 Canadians served in the mission at any one time, in tours ranging from four months to a year. A total of 70 Canadians served in ECMM between August 1991 and August 1994 when Canada withdrew from the Mission.

The ECMM observers were divided into teams and headquarters elements similar to the UNMOs of UNPROFOR (see page 176). "Although we worked as two distinct groups," noted Captain A.J. Collingwood, an UNMO in 1993-94, "the ECMM observers gave us a lot of flexibility because often what one group could not do with the warring parties the other could. The ECMM observers wore different uniforms. We shared information but they concentrated at the political level while we focused at the military level. So, for example, when we were in Mostar during the fighting there, the ECMM teams were not present. Their governments did not give them permission to deploy into hostile areas."[3]

As commander of the Canadian contingent in 1993, Colonel R.A. Gillespie was the Canadian head of delegation to the Mission (most contingents were headed by a diplomat). In addition, he was chief of operations for the Mission. In this capacity, he was responsible for coordinating all operational matters, including allocation of resources, prioritising of work and processing of information (the G2 and G3 functions). He reported to the Head of Mission through a Major-General from the Presidency.

On his return to Canada in 1994 he noted, "The situation in the former Yugoslavia is determined as much by the past as by the present. Old prejudices and events in many ways dominate the plans and activities of the present. The younger generation seem as confused by what is happening as the outsiders. They grew up in a Yugoslavia that was well off by communist standards. They now find themselves in a situation where their comfortable lifestyle has been seriously compromised by the war and its aftermath. With time they are also developing the hatred and prejudice that has affected the region for centuries, and it will take a long time for the present conflict to fade into history."[1]

The atrocities, dislocation and suffering, particularly of women and children, brought international demands for United Nations action to protect refugees and assist in humanitarian aid. In response, the United Nations Protection Force (UNPROFOR) was set up in early 1992 and Canada responded to the call for troops.

UNPROFOR - providing humanitarian aid

"This wasn't a UN tour like the others," recalled Corporal M.M. Porter, a 3RCR vehicle technician with the 1R22eR Battle Group in UNPROFOR in the spring of 1992. "People had it in their minds that they'd just be driving up the road along the main streets. The very first night we got shelled. All of a sudden it really hits you that these were real artillery rounds landing in your location and guys got nicked by shrapnel. That's when you finally realize that this is real. We were located in Sirac in a school that had recently been destroyed. They knew where our location was and they walked mortar fire in from two kilometres away - and then five or seven rounds of repetition."[4]

Canada's Craftsmen had been thrown into a near-war environment. Since the end of the Cold War in 1989 there has been a worldwide escalation in intensity of peacekeeping operations, and Canadian equipment deficiencies have become evident. It was an engineering challenge to upgrade equipment so that soldiers could be protected and be a credible force. In addition, since the two Canadian units operated in two widely-separated areas, they had to be resupplied through lines of confrontation that were often war zones. Hence, keeping enough equipment available for operations was a maintenance challenge. Maintenance resources were swamped by the increased frequency of repairs due to hard usage, high mileage - and battle damage.

3. Collingwood, Capt A.J.; taped interview with the author, 1995.
4. Johnston, Col M.C.; *EME in Yugo*; published in *Esprit de Corps*, December 1993.

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Operational Outline

UNPROFOR's mandate was to establish four United Nations Protected Areas (UNPA) within Yugoslavia. These were closely aligned to the Serbian Autonomous Regions where the majority of the fighting had raged. Two UN commands were set up; Croatia Command, and Bosnia-Herçegovina (BH) Command with each having four sectors.[5] The UN peacekeepers were to supervise the demilitarization of the UNPAs, provide security for the populations in the UNPAs, and ensure that neither side violated the cease-fire agreement, e.g. by bringing weapons into the UNPAs. UNPROFOR, with its headquarters in Zagreb, had 14,000 soldiers from 31 different countries.[6]

Canada's initial contribution was a battalion battle group and an engineer regiment. The 1er bataillon du Régiment 22ième Royal (1R22eR) Battle Group included the 1R22eR plus N Company 3rd Battalion Royal Canadian Regiment (3RCR) and an engineer field troop. It operated in Sector West and was accommodated in Camp Polom, a former Yugoslavian army camp near Daruvar. 4 Combat Engineer Regiment (4CER) had construction and field engineering responsibilities throughout all sectors and was located in downtown Daruvar with a detachment in Vukovar in Sector East.

In the autumn of 1992, two operational changes were made; another battle group was added and the engineer regiment was reduced in size to the equivalent of an engineer field squadron. Two logistical changes were also made; the Canadian Contingent Support Group (CCSG)[7] was formed and the battle group maintenance platoons were doubled in size. Long supply lines, two widely separated units, terrible roads and difficulties with getting materiel through UN channels had made it necessary to form a unit - the CCSG - dedicated to providing second-line supplies to the forward units. In addition, backloading equipment was nearly impossible. It was difficult to transport heavy assemblies and the frequency of repairs was higher than anticipated.[8] Battle group maintenance platoons were augmented to carry out increased number of repairs and rebuild assemblies.

CANBAT2 was assigned to Sector Northeast in BH Command. However, its deployment was delayed because of problems in crossing borders and confrontation lines and it remained in a muddy field near Camp Polom during the fall of 1992 until it could move south to Visoko (25 kilometres northwest of Sarajevo). In mid-1993 it deployed a detachment to the Muslim enclave of Srebrenica (80 kilometres northeast of Sarajevo).

CANBAT1 continued to work out of Camp Polom until 1993 when it was moved to Gra_ac in Sector South. In mid-1994 the areas of responsibility in Sector South were shifted and CANBAT1 was moved 35 kilometres southwest to Rastevic.

In January 1994 the name of the CCSG was changed to Canadian Logistics Battalion (CANLOGBAT). That summer the unit was moved to Primošten on the Adriatic Sea, 60 kilometres west of Split. The Maintenance and Transportation Platoons were located in the port of Šibenik, 30 kilometres northwest of Primošten[9] and just 10 kilometres from the confrontation lines.

During the summer of 1995 Serbian forces in eastern Bosnia-Herçegovina captured several UN-protected Muslim enclaves. Then NATO war planes struck and forced the withdrawal of Serbian guns surrounding Sarajevo. In September a Croatian offensive overran the Serbian Krajina,[10] and Canada's CANBAT1 was subsequently withdrawn. In early October 1995 a cease-fire was arranged in Bosnia-Herçegovina and Canada announced that it would withdraw CANBAT2 from Visoko in November. CANLOGBAT commenced its withdrawal in mid-December.[11]

5. In Croatia Command, Canada was involved in three sectors. Sector West was a 40-kilometre long strip 50-kilometres wide on the northern Bosnian border 100 kilometres east of Zagreb. Sector East was 90-kilometre strip 20 to 40 kilometres wide on the Serbian border. Sector South was a 110-kilometre long strip 20 to 70 kilometres wide on the western Bosnian border running from opposite Biha_ to Knin. In BH Command Canada was involved in Sector Sarajevo and Sector Northeast.

6. Hytennrauch, Lt G.L.; *LEME in the Former Republic of Yugoslavia*; unpublished article, 1992.

7. The unit was initially called Canadian Contingent Support Group (CCSG). On 28 January 1994 its unit name was changed to Canadian Logistics Battalion (CANLOGBAT).

8. Many of the European Type Vehicles that had been taken or provided had not been designed for the high, hard usage under wintry conditions that prevailed. The UN was often forced to use secondary roads, while the warring parties kept the main roads for their use. On the other hand the Canadian HLVW and Kenworth trucks had few problems.

9. Dundon, Capt R.; *Keeping the Wagons Rolling - Maintenance during Operation Mandarin Rotations 2B and 3 - 1994*; unpublished article, 1995.

10. This was the Serb held territory along the Croatian-Bosnian border. Krajina means military frontier and so it was for 700 years, a Serb enclave which had been settled there as a western buffer for Serbia against Turkish and Muslim kingdoms.

11. At the time of writing a NATO Rapid Reaction Force is deploying to supervise the agreement.

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Initial Preparation and Deployment

"Upon receipt of the 'heads-up' to the warning order, we immediately began planning for a deployed regiment of 250. My 35-person maintenance troop was to deploy only 30," recalled Captain D.C. Bell. "The troop's mandate was to establish a workshop with the main body of the regiment while still having the ability to support one deployed echelon. The five who stayed behind in the rear party were busier than expected. They helped families, hunted repair parts and ran messages. They were instrumental to the success of the mission."

The first thing done was to realign the troop from the usual functional sections, e.g. vehicle and ancillary, to something workable for the operation, i.e. a first-line section and a second-line section. The troop then began preparing the regiment's equipment. "We planned on performing some training immediately after we arrived in theatre." Captain Bell noted afterwards. "This may have been practical in a peacetime scenario. However, for this potentially hazardous mission, it was imperative that all training be done by all CSS personnel before deployment. There were just too many other things to do."

(In subsequent rotations the maintainers participated in the full unit training, which usually included weapons qualification, mine and improvised explosives awareness, first aid, NBCD, AFV recognition, radio voice procedure, map and compass, escalation of force and the area's history. Prior to going to Croatia in 1994, the Lord Strathcona's Horse (Royal Canadians) (LdSH(RC) went to Camp Pendleton in the USA for training. While they were there, 1 Service Battalion and 1PPCLI provided much appreciated maintenance support back in Calgary.[12])

When the warning order came to 4CER on 18 February 1992, 75% of the unit's equipment had been preserved and prepared for turn-in and return to Canada as part of force reductions in Europe. This meant that the maintenance troop had to set up a program which would depreserve this equipment, ensure its operability, have it re-kitted, painted and loaded on the trains. The unit was to take 250 vehicles and was to move in three weeks![6] "Piece of cake? No. It was completed on time and on target to such a high degree of proficiency that during my time in Yugo, the kit worked when it had to and the maintainers accomplished all military tasks to a high standard," Captain Bell noted later. "We never waited for parts due to a problem with scaling."

"On 31 March 1992 at approximately 1800 hours we began our move to Croatia. As the officer in charge of the train, I met some very interesting people. The train escorts from Austria usually would not let foreign troops pass through their borders. The Slovenian Army security people politely asked me to order my security people back onto the train during halts as they could guard the train. In Croatia, my conversations with the four Croatian security people aboard gave me an understanding of how non- understandable the situation was going to be down there!"[13]

"The train moves were a gruelling 48 hours filled with tension, excitement and anxiety," Lieutenant G.L. Hyttenrauch recalled. "The maintainers were tasked with running the canteens on the trains and they showed their usual ingenuity and entrepreneurial ability. Seizing the opportunity to increase the troop fund, they sold pop, chocolate bars, chips plus cookies and doughnuts from their care packages to the tense and hungry soldiers."

"As the first unit into the former Yugoslavia, 4CER received some amazing welcomes," Captain Bell noted. "Unfortunately, it didn't take long before the people realized that we were not supermen, and that we could not stop the fighting, or the ethnic cleansing, i.e. burning a family's house to the ground and driving them to the border. Nor could we stop the local children from walking on land mines.

"On 13 April 1992 we arrived in Zagreb at approximately 0700 hours and the train was split in two," Sergeant M.F.V. Hofstater of the 1R22eR Battle Group recalled. "One section carried the main body of personnel and the ammo cars while the other carried our vehicles. The journey to Daruvar was slow but tense - the realization of war was very apparent. Houses were blown up and people were carrying weapons. Pulling into Daruvar we passed where our headquarters was set up. Then we passed the old hospital - half was missing. Apparently it had been bombed in the attempt to knock out the railway. Daruvar for the most part had been left alone although quite a few houses had been destroyed and some businesses were burnt. All of the Serbs, no matter who they were or how long they had lived there, had been given 24 or 48 hours to

12. Gallinger, Capt M.J. and Jutras, WO J.C.F.; *Journal from LdSH Maint Troop*; unpublished article, 1995.
13. Bell, Capt D.C.; *Thoughts on being the first Unit Maintenance Officer in Yugoslavia;* unpublished article, 1993.

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leave. Then their houses were blown up. That night we heard artillery going off and the next thing we heard was that both A Company and N Company had been shelled (see page 163)."

Operational Support - EME

Often EME soldiers were employed as frontline soldiers. In May 1992 Major-General L. Mackenzie went to Sarajevo to negotiate the opening of the airfield so that humanitarian aid could start. He took with him several soldiers including Corporal R.W. Herrington, a vehicle technician. This was a time of heavy fighting in and around the area where the negotiations were being held. Corporal Herrington was assigned as a guard for the hotel where delegates stayed - until the mortar bombing became too heavy and the guards were withdrawn. He was then tasked to deliver food to two hospitals, driving a soft-skinned 5-ton truck. The route included "Snipers' Alley," an area where you "went around road blocks and definitely did not stop!" The hotel became the centre of a mortar and artillery attack and he spent several days in a bunker. All the group's jeeps were destroyed so the 5-tonners had to be used for the return. The road, however, was damaged and blocked. So while others cleared them, Corporal Herrington repaired broken brake lines and, as an expedient, was finally forced to use distilled water as brake fluid. It was indeed Arte et Marte.[14]

When the Christmas (1992) cease-fire was broken in Sector South, fighting broke out around Knin, the capital of the Serbian Krajina and the location of the UN Sector headquarters. At the time a field troop of 1 Combat Engineer was there to set up the headquarters. Instead, the troop and its MRT - which was headed by Corporal P. Guy - worked at fortifying the headquarters and were shelled frequently during the two weeks of fighting.[15]

Sometimes the role of front line soldier was suddenly and unexpectedly thrust on the technicians. Captain M. Sanchez, the maintenance troop commander of 12RBC, recalled one incident in November 1993, "In one area we had OPs on both sides of a bridge, one in Serbian territory and the other in Croatian. One day the Serbs took over the OP on their side. They held our soldiers as hostages, lined them up and fired over their heads. One of my corporals was in the other OP fixing a generator. When they heard the hostages being taken, the OP commander immediately reported the incident and made ready to attack. The EME Corporal was assigned to the GPMG. In the after-action report he noted that it had been stressful and that it had affected him a lot. However, on the OP commander's order, "You're a soldier too, man the GPMG," he did his job and found that he could do the things that he usually didn't do - he was a soldier-technician!"[16]

Combat Service Support for the CANBATs

When the CCSG resupply convoy drove into the camp of CANBAT2 in Visoko, Bosnia-Herçegovina on 17 December 1993, the troopers of 12RBC were relieved. It had been fourteen days since the last supply run. They had been eating hard rations and had been reduced to minimum fuel usage, i.e. no heating during the day, for a week. They were surprised at being relieved because the roads were very icy. In fact the CO's Cougar had slid off the road that morning and driving had been stopped. After pulling into camp the convoy's drivers and recovery crew headed for the dining hall. There the CO thanked them for bringing forward badly-needed supplies and even donated two beers per driver to them as an expression of his unit's thanks![17]

Two weeks earlier a bad snow storm had made driving very difficult for the Canadian HLVWs and totally impossible for the other contingents' logistic vehicles. CANBAT1 and the other two battalions in Sector South were short of fuel and fresh rations. The situation was so bad that CANBAT1 had to pump out fuel from their vehicles tanks in order to heat themselves. The responsibility for resupplying Sector South with combat supplies lay with the French Logistic Battalion (FRELOGBAT) located in Zagreb. The CCSG helped. Two of its HLVW recovery trucks assisted the three French 8,000-gallon fuel trucks, while a few of its HLVW cargo trucks carried fresh rations. The road conditions were so bad on the 115 kilometre route that two of the French tankers had to be pulled over 40 kilometres - their drive axles had broken. It took the convoy 13 hours to get to its destination, but the mission was accomplished. The fuel and the rations got through.

14. Herrington, Cpl R.W.; *EME in Jugoslavia*; unpublished article, 1993.
15. Lacey, Capt K.; taped interview with the author, 1994.
16. Sanchez, Capt M.; *EME in Visoko 1992-93*; taped interview with the author, 1994.
17. Eldaoud, Capt N.; *Supporting the CANBATs in Yugo in 1993*; unpublished article 1994.

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These two examples illustrate how the drivers and recovery crews of CANLOGBAT provided second line combat service support to the CANBATs under difficult and dangerous conditions.[18]

From a resupply point of view the Canadian deployment in the former Republic of Yugoslavia was extremely awkward at the end of 1993. CANLOGBAT in Sector West was fairly easy to get to by air, land or sea. The two CANBATs, however, were widely separated and far away, one in Sector South and the other in BH Command. Air access to them was limited and unreliable. The roads were few, narrow, and tortuous, and crossed many confrontation lines. Bad winter weather and risk of fighting and snipers added to the problem. Resupply was done through a system of four distinct convoys for everything except combat supplies. Convoy-1 comprising eight vehicles resupplied CANBAT1 from Daruvar twice a week and covered 900 km on the road in two days. Convoy-2 comprising ten vehicles put goods destined for CANBAT2 in transit in Plo_e once a week, covered 975 km on the road and 600 km on the sea in two days. Convoy-3 comprising twenty vehicles resupplied CANBAT2 from Plo_e once a week and covered 1,400 km on the road in three days. Convoy-4 comprising eight vehicles resupplied CANBAT2's company-sized detachment in Srebrenica when required and covered 1,600 km on the road in three days.

The move to split in 1994 was intended to make resupplying the CANBATs easier, particularly for CANBAT1. But the route to Visoko remained difficult as the Bosnian Serbs became increasingly aggressive.

Each convoy included a recovery crew. The convoy commanders were master-corporals or sergeants and there was one driver per task vehicle - two for the recovery vehicle. The types of vehicles used were mainly the 10-ton HLVW and the 15-ton Kenworth PLS (pallet loading system). The PLS permitted a driver to load, move and unload a pallet full of stores without any external help. The pallets could carry stores or 20-foot sea containers to a maximum load of 10 tons for the HLVW and 15 tons for the Kenworth. The HLVW was often the only logistic vehicle able to carry out its duty during extreme weather and road conditions. The French liked to call it "la sale bete" (the bad beast). They were good vehicles, the drivers and the maintainers liked them and by 1995 HLVWs had replaced most of the older equipment initially shipped from CFE.

Crossing confrontation lines and national boundaries could mean up to three checkpoints; Serbian, UN and Croatian. Missing checkpoint crossing times often meant delays or being turned back. Meeting the checkpoint times was no guarantee either, as the warring factions used delays at crossing points to emphasize to the UN that they owned the country. Delays could also have been used to mask illegal military moves from UN eyes. "The bridge at Zvornik on the Serb-Bosnian border a few kilometres from Srebrenica was famous for delays," recalled Chief Warrant Officer B. Dionne who, as the CCSG RSM, accompanied Convoy-4 to Srebrenica in December 1993. "The Canadian detachment there had been cut off for some time and was on hard rations. So the supplies that we had were desperately needed. As well, it being Christmas we had canteen supplies, including some rum. We arrived on time on Day 2 of the trip. We were told that we didn't have clearances. We did but we were turned back anyway. The next day we return and Egyptian, Norwegian and Russian UNMOs tried to help us. But the Serbian area commander wouldn't let the canteen truck through. The Canadian detachment commander came down and tried to help too. Finally the Serbian translator made her way to the truck and with the detachment commander had the rum transloaded to the UNMO vehicle and the convoy proceeded. We were now well behind schedule, which caused us to be turned back yet again at the border on the way back. In the end the trip took four days - it should have taken two. However, the objective was met - deliver supplies and extract soldiers going home on UN leave."[19]

Convoys had other hazards too, including potholes in the roads, people throwing rocks, and snipers. "When we were on convoy we would put grills in the front of our vehicles because of people on top of bridges throwing rocks at us," recalled Corporal V. Harrisson. "We would drive very fast keeping the vehicles about three feet apart so when the rocks hit the first vehicle they would just bounce from roof to roof and not break the windshields. On our first convoy, one driver had his face injured by a big rock that was thrown and broke the windshield of his truck. After that we put grills on the windows and other reinforcements on the vehicles such as bullet-proof blankets all around the vehicles and ourselves. Sometimes you would park your vehicle and when you came back to it, it would be full of bullet holes and

18. The convoy drivers and recovery crews maintained a tradition that was commemorated on a plaque on the wall of the Hugomont Farm where the Grenadier Guards held out all day during the Battle of Waterloo, June 12, 1815. The plaque reads, "To the members of the Royal Wagon train who fell bringing forward the ammunition." It is perhaps, the first time that Combat Service Support has been commemorated on the field of battle.

19. Dionne, CWO B.; *The Road to Srebrenica*; unpublished article 1994.

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you would think it was a good thing I wasn't in it, but you would also think maybe some of it happened while you were in the vehicle and didn't notice because the gun was a small calibre and there was so much other noise around you."[20]

"In spite of numerous constraints our Canadian system was flexible and could adapt to any situation," Captain N. Eldaoud noted in 1993."[17]

Maintenance in the CCSG/CANLOGBAT

The first members of the CCSG maintenance platoon arrived in Camp Polom in October 1992. "We started with nothing," Warrant Officer J. Lindsay recalled. "We were 14; the captain, myself, a sergeant, clerk, welder and nine vehicle technicians. We were supposed to look after 80 vehicles, but when we arrived there were 180 vehicles - mainly ETVs. We had no parts, no books, no tools, and no place to work. We started using what was left of a building in Camp Polom, an old Yugoslav army camp. It was the frame of a three-bay garage, 47 by 75 feet." It was also the start of a four-month self-help project in which the technicians devoted much of their spare time to building a workshop. "Sunday was our day off work," noted Master-Corporal R. Gilbert. "It was the day we worked on the building."[21] Warrant Officer Lindsay made a trip back to Germany where he was able to get tools from units that were closing out. Meanwhile, the number of vehicles was increased to 250 and the platoon strength was increased to 39 in February. To make enough work room for the workshop, they had to clear some of the forest - it was mined.[22]

An opening ceremony for the main building was held on 20 March 1993. Across the main entrance a metal rod was stretched between two wreckers. Prayers were read by Master-Corporals J.A.M. Lavoie and G.E.M. Semegen. The EME flag was raised by Warrant Officer Lindsay, Sergeant F. Mainville and Master-Corporal Semegen. The padre blessed the new building. Then the CO, Lieutenant-Colonel B.J. Phillips, cut the rod with a cutting torch, which also unveiled an EME badge. Then everyone moved inside for refreshments that had been set up in the old three-bay area.[23] However, this was a war zone as Corporal V. Harrisson recalled, "We had just finished celebrating the opening when the camp came under fire. Somebody had started throwing grenades and we were about 100 ft from the road so we didn't know if they were actually aiming at us. It kind of broke up the party, as everybody scrambled around trying to grab rifles to get ready just in case. We stood to for six hours, since we didn't know if it was because we were too noisy, or if they didn't like us to have fun, or just plain and simply that they didn't want us there. They had made this clear right from when we first arrived.

"We had around 200 vehicles in Camp Polom. My main job was recovery and my secondary job was inspections on the vehicles. Inspections suffered because recoveries sometimes took so long. We learned to be very careful where we drove and to take the safest route. Sometimes a vehicle would be only 20 kilometres away but due to war conditions we often had to go 300 to 400 kilometres around to avoid crossing unfriendly territory. A 20-kilometre recovery call could turn into a week with all the detours, crossing points, proper papers and authorities. On one convoy we were made to wait for a week at a crossing point before they would let us through. We tried to cross the bridge into Bosnia-Herçegovina but they wouldn't let us, because they said we had to pay for the vehicles to be on the road. We had to turn around to go back to Croatia, at the Croatian line they said, "No, you crossed the line now you stay there." We were stuck in no man's land on the bridge - on one side Croatia, on the other side Bosnia. We just sat there and looked at them, until they finally decided to let us through.

"It makes you nervous when you can see one side firing at the other side at night. Sometimes the firing was far enough away that you couldn't hear it you just see the lights, it's like a lightning storm at home, only this was no lightning storm. We were never in any danger of being harmed, nobody threatened us. I think it was just their way of showing us that they still owned the land and they would decide what we can do."[20]

The old three-bay frame had become the main building of the maintenance platoon. It was called the Jacques Lindsay Building. Later, by the main door a plaque was added which read, "Dédié aux bâtisseurs de la maintenance du groupe de support du contingent canadien, au Capt M Bedard et Adj J Lindsay et leur

20. Harrisson, Cpl V.; *A Bridge too ...Far Away?*; unpublished article, 1994.
21. Gilbert, Sgt R.; taped interview with the author with the author; 1994.
22. Lindsay, WO J.; taped interview with the author, 1993.
23. Semegen, Sgt G.E.M.; 18 photos of UNPROFOR, CCSG 1993.

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équipe (Nov 92). Dévoilé le 6 Décembre 1993 par le Col MC Johnston , Col Cmdt du GEM".

{The CCSG had its main group in Camp Polom and a forward logistic group in Plo_e. The maintenance platoon was composed of 47 personnel and structured like a normal first-line maintenance platoon but with extra technicians to execute all second-line repairs. The platoon was responsible for CCSG equipment only, which included approximately 280 vehicles. In Camp Polom the workshop was in two buildings. The production section worked out of a sprung shelter beside the main building. The spare parts section worked out of a SEV shelter and in sea containers. The main building had the platoon headquarters, the control office, the tool crib, the inspection section and the ancillary section. To maintain their morale platoon members had a canteen area in the main building. Every day at the morning and afternoon break they could watch music videos on TV, or play cards, or tell their friends their latest convoy experience. At one end of the canteen you could usually find Boyo, the translator, who used his spare time to draw cartoons or to make caricatures of platoon members. The detachment in Plo_e had five technicians, 2 MRT/wrecker crews and a welder. They were responsible for the 80 vehicles used for Convoy-3 and for holding stores.}[24]

After the move south in the summer of 1994, the maintenance platoon was set up in a warehouse on the fringe of the port city of Šibenik, a twenty-five minute drive north along the coast from Primošten. The warehouse was 24 by 110 metres. One-third of the roof was missing, the result of naval gunfire. One of the ceiling's I-beams had been hit in the lower-half of its centre yet, amazingly, it could support its own weight and only sagged two or three degrees! The parking-lot was formerly the site of three large oil reservoirs. A primary target for naval gunfire in 1991, they had burned to the ground leaving nothing but slag and a thick black tar, over which a metre of gravel had to be placed to make the site usable. Ventilation and natural lighting within the workshop were exceptional: rains were as refreshing inside as they were outside the building! A hard-working advance party headed by Master Warrant Officer D. Breen enabled the workshop to be up and operating within two weeks. It proved to be an excellent facility.

Security at the port could have been a problem, as there was no fencing to secure the site and only a roving patrol served as a deterrent at night. However, Wrecker, the platoon dog, proved to have a nasty disposition towards Croatians and could smell one anywhere in the compound. He took the responsibility of security very seriously and frequently stopped the theft of vehicle components. Word of his ferociousness spread and bandits were held at bay simply by rumour. Table scraps were a small price to pay for Wrecker's loyal service.[25,26] "Our 47-person maintenance platoon was responsible for 320 vehicles," recalled Captain R. Dundon. "Conveniently, it was located with transportation platoon, our most frequent customer. Transport personnel were readily available to discuss specific problems and concerns regarding the fleet and we could do quick examinations of the fleet as required without having to bring the vehicles into the shop. Both platoons found this to be mutually beneficial. Inevitably then, work within the shop was closely linked to the convoy schedule. This enabled us to forecast work within the shop and anticipate VOR surges.

"The maintenance platoon also served as the Canadian Contingent's BLP for return of damaged vehicles and equipment to Canada. This was a mixed blessing. It was a fascinating and sometimes depressing job. Typically, the vehicles being returned to Canada were armoured vehicles that had incurred considerable damage due to a mine-strike. The raw power and lethality of the mines in theatre that could be seen as damage to APCs was unbelievable."[9]

In 1995, welcome additions to the recovery section were gas-powered rescue saws. These were easily mounted on the rear deck of the wreckers and could come in handy in the event of a vehicle accident with people trapped inside their vehicle.[27]

Maintenance in the CANBATs

The operational situation in the former Republic of Yugoslavia was one of constantly-changing taskings and locations. The Canadian units were continually adapting to new situations. Several things were

24. Bourassa, Lt R.; unpublished article, 1994.

25. CO CANLOGBAT message to DGLEPM, October 1995. Wrecker was the workshop guard dog. He was accompanied by three cats, Arte, Marte and Tigger. Arte died in the fall of 1995 and was `buried at sea'.

26. Cantin, LCol J.G.B.; letter to the author, 1995. Wrecker was a mascot of the CCSG/CANLOGBAT for most of that unit's existence and at one time or other had guarded all three of its locations. In the summer of 1993, the CCSG had three dogs, Lady and her two puppies, Rocky and Wrecker. Rocky was the RSM's pet in Camp Pollum and the other two were at Plo_e where Wrecker early displayed his dislike of Croatians. When Camp Pollum was closed Rocky was given to a Croatian family. When Plo_e was closed, Lady was brought back Canada at the Detachment Warrant Officer's expense and Wrecker was relocated to Primošten as part of the last convoy to leave. He was riding in the wrecker!

27. LeBlanc, Capt D.J.; *OP MANDARIN - CANLOGBAT Maintenance Company 1994-95*; unpublished article, 1995.

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constant; hard equipment usage due to poor roads and battle damage, high mileage due to widely-dispersed units, difficulty in resupplying units because of confrontation lines, and the unsuitability of the vehicles for the region. As a result, the original allocation of 30 technicians per unit was not enough. Within a year, unit maintenance platoons had been increased to 70 technicians. All first and second line repairs and, to the extent possible, assembly and component repairs were done in situ.

Maintenance in the CANBATs was done in austere workshops organized to suit operational conditions. mobile repair teams and recovery teams often worked under dangerous conditions - bombardment, harassing fire, minefields, narrow treacherous roads or steep slippery terrain. Innovation, courage and hard work were the order of the day.

Austere Workshops - Operationally Organized. Soon after its arrival in Daruvar in March 1992, 4CER was set up in a location about the size of a city block, in three main buildings. The maintainers were given a six-bay garage that had been used by a tractor repair company. It had been hit by shrapnel from a bomb and the roof was peppered with large holes, the windows were gone and the shop floor was littered with broken and dismantled heavy equipment as well as dirt and debris. The maintainers cleaned it up and, when finished, they had a facility with four repair bays, a 5-ton overhead crane, a control office, spare parts section, offices and a large canteen. They also built accommodations upstairs for the senior NCMs. It did not take long for the building to become quite comfortable to work and live in and was soon dubbed "The Castle" by other members of the regiment.[6] The final touch was a mural painted by Corporal D. Desouva featuring the EME badge and the names of the members of the maintenance troop.

Originally, 4CER was to set up a base camp and support one echelon. Instead, its equipment was almost always detached out to one or more of the fifteen or so battalions in UNPROFOR. Sometimes one armoured engineer vehicle (AEV) technician was 300 kilometres east and the other one 300 kilometres west. "In order to support such widely dispersed detachments," Captain Bell noted. "We juggled the troop's resources. We had started with a wheeled MRT and a tracked MRT. We combined them to make two wheeled/tracked MRTs. Then we emptied a 5-ton parts truck and loaded it with AEV parts and sent it to Sarajevo with the 1R22eR's engineer troop. Because of the terrible communication system, keeping in touch with MRTs was virtually impossible. When an MRT left, we would not expect to hear from them for three or four days. This also left us short of bodies for defence duties."[13]

The 1R22eR Battle Group initially deployed into the Pacrac/Daruvar area. On the first night two of its companies were bombarded by mortars (see page 163). Soon after, it moved to Camp Polom, where its maintenance platoon was installed in two semi-destroyed workshop buildings. The battle group patrolled actively and its M113 APCs averaged 900 kilometres per month. "It was the work of four battalions," noted Captain M.P.J. Tremblay. "However, we kept the VOR rate down to 3%.[28]

In Visoko the CANBAT2 workshop was in the basement of an unfinished, abandoned factory which had no windows. "Regimental headquarters were on the upper two floors," Captain Sanchez recalled. "The workshop floor was sand but we had a few concrete pads which our predecessors had had made by contract for some hard standing. We covered the windows with plastic to keep out the cold but the exhaust stayed in. There was no heat or power. It was not a good working environment with dust, fumes and cold. The workers had to dress quite warmly. Our materials technicians designed some screens which blocked the wind at ground level around vehicles. We used tents inside for offices, spare parts and ancillary. Mechanics would also go there to warm up. The tents were soon decorated everywhere with EME flags!

"The vehicles were heavily used for escorting convoys going through our sector and for keeping the road open as much as possible for humanitarian aid. It made sense then to organize the troop for centralized maintenance. Sergeant C. Larivière, our FCS sergeant, was put in charge of a section that did all second-line repairs. There were first-line repair sections for; wheeled vehicles, tracked vehicles, and weapons and FCS. There was also a section for materials and small engines. This arrangement distributed the workload fairly evenly among sections and suited the conditions under which we were working at the time."[16]

In the spring of 1994 the LdSH(RC) replaced 12RBC as CANBAT2. At the same time their mission changed to include more outposts. Maintenance was organized on a decentralized basis with squadron detachments. A company was moved 120 kilometres south to Garazda to support a British battle group

28. Tremblay, Capt M.P.J.; unpublished article, 1993.
VOR means Vehicle Off the Road, i.e. no more than 3_ of the vehicles were unserviceable.

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there. Thirty-six hours before they moved, the Bosnian government forbade tracked vehicles. There was a frantic scramble to re-equip with AVGPs, rescale repair parts and increase wheeled MRTs.[12]

By this time, the unit had 450 vehicles and trailers, 1,500 weapons systems - including TOW Under Armour - and 1,200 pieces of communication equipment. "Sergeant T. Lawrence and his supply technicians in the SPSS worked many long hard hours issuing parts and reorganizing the first and second line accounts so that we could have the flexibility to respond to any situation," Captain M.J. Gallinger and Warrant Officer J.C.F. Jutras recalled. "With over 5,600 line items as well as a supply line that stretched 400 kilometres to CANLOGBAT and a further 3,000 kilometres to Canada many miracles were performed. During our six months we down-sized our spare parts holdings twice and rescaled so that we were holding fifteen days spares on wheels and the remainder in sea containers ready to move if required.

"Normally, weapons systems technicians go to the ranges to zero weapons - not so in Bosnia-Herçegovina. They designed and built a small arms zeroing range in the middle of the maintenance lines. It was known as the 'Thunderdome' because of the echoes heard throughout the building. The battle group conducted several live firing practices in the Kisiljak Pocket. All weapons including crew served weapons were also test-fired. The ancillary section was a hive of activity.

"In addition to that we got involved in some third-line work. At that time the main road which went around the Kiseljak Mountain to Sarajevo was "a hair-raising experience". Our engineer troop was given the task of improving it by putting in lay-bys, levelling it, and gravelling it. It was difficult for the 32-ton Steyr dump trucks to manoeuvre. Soon three out of four had been severely damaged by accidents. Two had rolled and one had hit an APC. We got approval to reclaim at least one serviceable truck from the parts of three. Master-Corporal J. Despres was in charge of this third-line repair project. Only one frame was bent so, in a week-and-a-half, by switching cabs, engines, transmissions etc around we had two serviceable trucks."[29]

When the maintenance troop asked to fly the EME flag on May 15th, the CO said fly it for a week. That too was visible thanks for a job well done!

Maintenance under Fire. In the war environment in the former Republic of Yugoslavia maintainers were subjected to harassing fire as they did their work. Often the repairs they did were due to battle damage. For example, in early June 1992 a platoon-sized group made a reconnaissance to the Sarajevo airport with the aim of opening it for humanitarian relief flights. The group had fifteen vehicles including one MRT vehicle and one vehicle technician, Corporal J.J. Boudreault. They travelled as part of a French army convoy of 65 vehicles.

"Once we arrived at the UNPROFOR headquarters in Sarajevo, I verified the condition of our vehicles and helped two French army vehicle technicians with their equipment," Corporal Boudreault recalled. "The journalists who had accompanied [us] requested assistance for their damaged vehicles. So did the Bosnians whose ambulances were picking up dead bodies. I started to establish a list of all serviceable and repairable airfield support equipment. We remained in the UNPROFOR headquarters area for two weeks, enduring repeated and continuous attacks."

When the Canadian and French platoons deployed to take possession of the airport, one of the Canadian jeeps broke down. Corporal Boudreault put it on tow. "At the airport, we parked the small vehicles inside a building and the MLVWs in front. As I began to repair the jeep I was asked to see if there was any electricity. A Serb electrician indicated that there was a generator on the other side of their position. In trying to retrieve it a Serb soldier beside me was shot. Our medical assistant went to help him but it was too late. The Serbs then realigned their tanks and fired on a Muslim village. It was awful. I abandoned the generator idea. I then discovered an electrical panel with high voltage which I was able to convert. Soon we had TV and coffee. The French soldiers were very impressed with our Canadian ability to quickly acquire these simple luxuries.

"After three days in this location we were ordered to return to Camp Polom. We patched up all the vehicles. The drivers did the tires and I did the hoses and radiators. As we started I could hear incoming mortar fire. I dove for cover and felt the spray of the shrapnel just over my head."

When the returning Canadian/French convoy was 200 metres from UNPROFOR headquarters the Muslims renewed their mortar attack. A Canadian jeep received a direct hit and was immobilized. Its three-

29. Gallinger, Capt M.J.; taped interview with the author, 1995.

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man crew were wounded. The driver ran to the ambulance a few vehicles back. As per drill, all vehicles immediately dispersed. Corporal Boudreault, at the end of the convoy with a jeep on tow, drove to the UNPROFOR parking lot and unhooked the jeep that he was towing. He then rushed back, recovered the disabled vehicle and picked up the other two wounded. To fix both jeeps he used parts from a destroyed Volkswagen Golf car that was in the parking lot.[30]

"The next morning we patched tires, saving four out of six. On one, I put seventeen patches. We were forced to return by narrow mountainous roads. I made several running repairs to our own and journalists' vehicles. Finally the convoy was stopped. I was ordered to the front to help recover a French armoured vehicle that had almost fallen off the cliff. After another kilometre we encountered a Muslim tow truck stuck in mud above its axles. I was detached from the convoy to help them. We finally caught up to the convoy and three days later got to Belgrade. The reconnaissance party was directed to rooms to relax. I and my partner fixed tires first. The next day we were back in Camp Polom." Corporal Boudreault was awarded a Chief of the Defence Staff Commendation.

Three days after this reconnaissance was completed, 1R22eR Battle Group was deployed to the Sarajevo airport for a month to enforce a cease-fire that allowed the airport to be opened for humanitarian relief flights. The maintenance platoon was bombarded twice during this period, yet it maintained a VOR rate of less than 6%. "Luckily there were no injuries," Captain Tremblay recalled. "Later the 1R22eR built a chapel in Camp Polom. It was constructed in an old stable. The unit named it after our patron saint, St-Jean de Bréboeuf, in recognition of our contribution to the unit."[28] Perhaps that was the best thanks of all for a job well done!

Recovery under dangerous conditions was a continuing fact of life. In the summer of 1994 a recovery team from the maintenance platoon of 2PPCLI extricated a French vehicle from the minefield near the Medak Pocket.[31] "This area was renowned for being heavily mined. Sergeant J. Belisle and I went ahead as a reconnaissance party," Master Warrant Officer B. Lauzon recalled. "At the RV, we were met by a French officer and a few of his field engineers. They had already cleared anti-personnel mines from around the entranceway to the open field. The French patrol in its APC had worked its way about 400 metres into a minefield before encountering anti-tank mines. The vehicle crew of eight men was still with it - somewhat stranded. The distant hedgerow showed a glimpse of their white APC and the UN flag visible on top of a radio antenna.

"The French officer briefed us. Then we started our survey, walking in the vehicle ruts. He reluctantly followed. The field was soft and very wet so we radioed our co-located rifle company for their ARV(L)[32] as backup. As we finished our reconnaissance, the wrecker arrived. Scepticism showed on the faces of our French UN friends. Rather than Bessie, our 5-ton diesel wrecker, they were expecting something heavily armoured and maybe tracked!

"After a briefing Corporals H. Alkerton and B. Watson decided on a new route through the field. We assisted the French engineers to do a quick sweep for mines at the newly-chosen entrance point. It was clear. The arrival of the ARV(L) offered extra assurance for success in the mission. Bessie dropped her tilt-bed trailer on the roadway and roared up the small track towards the field. Mud flew in all directions as the old wrecker intruded into the field. There was only a brief instant where the exhaust tone indicated some 'heavy hauling'. Then she was through, so far so good. The ARV(L) followed the already defined track. Both sides of the track were heavily lined with brush and partially-visible anti-tank mines were easily spotted only inches away. The French crew had a small safe area marked out with mine tape directly behind their vehicle. Pieces of the disabled vehicle suspension and chunks of tire were seen clinging to surrounding bushes.

"The recovery crew opted for a rear extraction. The French crew was evacuated back on our in-route. We lined the floor of the wrecker with a few extra flack jackets. Corporal Alkerton backed Bessie perfectly straight for 40 or 50 metres up the narrow track - not an easy task on a track with less width than the wheelbase. We feared the casualty would not pull straight and might veer off track. Even inches could mean a further blast and the possibility of injury or more damage.

"The vehicle rested in a crater, so the plan was a short pull to clear the crater followed by a

30. Boudreault, Cpl J.J.; *Soldier First!*; EME Journal 1/95.

31. In the summer of 1994, Croatians cleared Serbs from the Medak area which is 40 Kilometres Northwest of Gracac. In order to stabilize the situation, 2PPCLI forced the Croats back and kept the area empty.

32. A M113 Armoured Personnel Carrier fitted with a heavy winch and tools for recovery.

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suspended rear hook up. Once in position, the extra flak jackets were transferred to the rear deck. Operating from the prone position Corporal Alkerton commenced the pull. Eyes winced in expectation of a further blast. No blast - out it came. The French audience erupted in loud conversation. We were halfway there. The narrow trail was easily navigated with the load on the hook. The wrecker earned its keep in the soft field although the heavy mud almost stalled it out with the extra load on back. "Our French friends cheered as Bessie pulled onto the hardpack. A great feeling of pride and accomplishment went through me as our small convoy prepared to return. I noticed that somehow each of our vehicles was proudly flying small EME flags. Arte et Marte - what well chosen words I thought as we all hurried back knowing full well there was yet much work waiting to be done."[33]

The warlike environment often made recovery impossible. As one 12RBC supply convoy was crossing a bridge it came under harassing fire. Vehicles were immobilized with shot tires and radiators and, for the safety of the drivers, abandoned. In one case recovery technicians from the maintenance troop were able to go back at night, quietly put a tow cable on an abandoned vehicle and then tow it to safety. In another case the truck had to be abandoned. "The area wasn't safe. It was a confrontation line," Captain Sanchez recalled. "I didn't want to send a maintainer there and risk one soldier's life for a truck. The unit agreed. I sent a message to NDHQ asking to have the truck PCC'd without having to bring it back and have it inspected. This was approved. It is probably the first time since the Korean War or World War Two that equipment has been written off like that."[16]

The steep slippery terrain made recovery more difficult too. The 1PPCLI had a M113 APC on a hill as an OP. The area was always under sporadic harassing fire. The approach was a narrow track with several switch backs, mines on both sides and a steep drop off the edge. One day, when a replacement vehicle tried to go up the hill, it threw a track. Master-Corporal D. Gauthier and her MRT crew then had to edge by the disabled vehicle, pull it up the rest of the way and, at the top, replace the track while under harassing fire.[34]

Harassing fire was a continual danger. On one convoy from Visoko to Srebrenica the 5-ton wrecker that artisan M.C.C. Pilon was driving was hit by a bullet entering the window just above the driver's head, exiting through the roof. He was wearing both his flack jacket and his helmet. In another incident, a convoy that was coming back from a mission stopped at a little village about 10 minutes from Visoko because an APC was broken down. {It was a dangerous area, because the Serbs were close and often there were snipers shooting.} The maintainers got out of their vehicle to hook up the APC. While they were working, an RPG7 fired at them from about 100 metres. The only help came from the medic who put his vehicle into the line of fire to cover the maintainers while they worked. In the after-action briefing they said, "We are there. We go out. We do our job. The operator never gets out and helps us. They stay inside their vehicles. But we maintainers have to go out and go unprotected and hook those vehicles and the only ones with the guts to help us are the medics! We work hard. We are in danger. We don't get any of the glory."[16]

It put new meaning to combat service support - under fire.

Modifying Equipment in Theatre

Operations in the near-war environment in the former Republic of Yugoslavia revealed equipment deficiencies. Modifications to correct these deficiencies were made wherever and as quickly as possible. Sometimes modifications were made "in battle", as in the spring of 1992 when the program to update the TOW anti-tank guided missile system mounted on M113 APCs[35] was being completed in Canada and CFE. Some CFE vehicles, however, were at the Sarajevo airport where the Canadians manned a defensive perimeter and were under constant harassing fire. The project team was dispatched to the airport where the final modifications were done. The enhanced capability of TOW Under Armour gave the harried Canadians a much-needed extra punch to help keep the airport open for receipt of humanitarian aid.

Sometimes lack of supplies and/or special situations required EME Craftsmen to design equipment modifications and install them in situ, there being no time to wait for support from Canada. For example, in early 1994 the situation in Central Bosnia-Herçegovina was extremely tense. 12RBC was guarding the patients from the two mental hospitals who had been abandoned by the staff when the fighting got too close.

33. Lauzon, MWO B.; *Recovery at its Finest!*; unpublished article, 1995.
34. Eastman, Sgt E.; taped interview with the author, 1995.
35. The original program for installing the TOW on APCs had been done in 1977-78.

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A resupply convoy was attacked while enroute to one hospital. The driver of a 32-ton dump truck full of coal had been shot in the foot and his vehicle was abandoned under hostile fire. A 5-ton pod truck full of diesel was also attacked and abandoned during the same incident. Each time that 12RBC went back to the site to recover the vehicles or to resupply the hospital, the soldiers were forced away by machine-gun fire. After a couple of tries, the CO of the unit had had enough and requested UN authorization for the use of force to resupply the hospital and to recover the vehicles. The UN Commander gave his approval and offered a number of British Warrior armoured vehicles as support and stated that he would go on the mission.

In order to resupply the hospital with the much-needed heating coal and diesel fuel, another 5-ton pod truck and 32-ton dump truck were selected. Captain M. Sanchez, the maintenance troop officer, was asked to mount armour plates inside the cabs of the vehicles to protect the drivers. She didn't have much time - the operation was to be the next morning! She also quickly realized that this was not a practical option - the plates would weigh too much and there were none available. A production team headed by Warrant Officer J.G.P. Merette divided up the work to be done and prototyped their way through the manufacture and installation of the system they had envisioned. The work went on throughout the night and by morning the vehicles were outfitted with Kevlar plates bolted around the outside of the cabs, as well as an inverted T-shaped arrangement of Kevlar plates which could be mounted inside the windshield, thus offering protection from the front. The work included manufacture of the fabric pouches, mounting of the Kevlar to the outside of the cabs, and the inner protection system behind the windshield.[36,37]

The driver of the dump truck appreciated the team's efforts. He drove without the windshield insert until he was near the area where trouble could be expected. At that point he mounted the insert and carried on with reduced field of vision but also with enhanced protection. The mission went off without a hitch, supplies were delivered and the vehicles were recovered.

Several months later, the Kevlar protection system was still mounted on the dump truck and it had continued to provide much-needed protection to the Engineers in the Battle Group. Captain Sanchez's report lead to a project to provide ballistic and blast protection for vehicle crews (see page 222).

Some engineering problems were answered by getting a better piece of equipment. During the fall of 1993, harassment by the warring factions caused the CO 12RBC to ask his maintenance officer to have the unit's Iltis jeeps armour plated, the Kevlar protection being insufficient. This would have made the vehicles top heavy and dangerous to drive. Captain Sanchez advised against this approach and recommended purchase of armoured Land Rovers. This was accepted, orders were placed and the new vehicles were delivered in three weeks.[37] A neighbouring British unit, the Royal Anglians, also had these vehicles. Their LAD provided help in spares and maintenance expertise reminiscent of the close RCEME/REME association of World War Two. It also led to a series of informal exchanges as REME and EME Craftsmen learned how the other coped with the problems of peacekeeping in a hostile environment.

One of the most serious equipment deficiencies in the heavy weapons environment in the former Republic of Yugoslavia was the lack of personnel protection afforded by the M113 armoured personnel carrier and wheeled armoured vehicles (AVGP and BISON). Overcoming this deficiency became a priority with LCMMs in NDHQ.

In the case of AVGP and BISON there had been some prior developmental work in developing enhanced armour protection (EAP), and a system featuring ceramic tiles mounted on Velcro was recommended for sole source procurement. At LETE, installation kits were quickly developed, designed to be applied by the operator of the equipment. Installation was done in situ by a special team which included Captain H.D. MacLean, Master Warrant Officer M. Fedorowich, ten artillerymen and two crewmen from Petawawa.

Prior to deployment the team was trained at 202 Workshop Depot where EAP was installed on 10 vehicles and a further 18 were prepared for installation. These were shipped to the former Republic of Yugoslavia by sea. Their arrival corresponded with that of the team by air on September 25th. Starting the next day, the team worked at CANLOGBAT's location in Šibenik to install EAP on the previously-prepared vehicles, plus an additional 31. A month later the team moved via the weekly resupply convoy to CANBAT2 where 23 vehicles were modified.

36. Brown, Capt S.J.; *a G4 Maint in Croatia in 1994*; letter to the author, video and 11 photos, 1995.
37. Sanchez, Capt M.; Report on personnel protection in soft skinned vehicles; DND letter, 1994.

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In Visoko, several failures were noted on the cover material below the AVGP muffler exhaust. Even though a heat shield had been added to the pattern, the installation failed as the cover material below the heat shield burned. Master/Corporal C.P.P. Barcier, using fire blanket material, replaced the burnt material and extended the heat shield by three inches. This innovation became the basis for an engineering design change proposal which fitted to all spare kits.

Meanwhile a Canadian firm, DEW Engineering, had been contracted to apply add-on armour to 85 M113 armoured personnel carriers. The firm's crew of 15 did the work at CANBAT1 and CANBAT2. The LCMM acted as the point of contact between the crew and the battalions, and was responsible for signing-off the installations. The senior materials technician in each maintenance platoon inspected the welding on the armoured aluminum.

Not wishing to infringe on limited tools and supplies locally available, the crew brought all necessary items including generators and air compressors. The only supplies requested were fuel to operate the equipment and argon welding gas. In CANBAT1 the crew worked in a specially-erected tent, while in CANBAT2 they worked in the poorly illuminated, damp and dusty maintenance platoon area. A total of 65 installations were conducted at CANBAT1 and the remainder at CANBAT2.

In a three-month period, despite several delays due to late arrival of installation kits and hostile action, 157 armoured vehicles received either add-on armour or enhanced armour protection. {It was indeed engineering in situ!}

One of the most glaring deficiencies in equipment became very evident at the Sarajevo airport in the summer of 1992. The M113 APC crew commanders were exposed when operating their .50-calibre machine guns.To improve gunner protection LETE was assigned the project. An American APC Crew Protection Kit was quickly purchased and adapted to the Canadian M113. Warrant Officer D. Foster and Sergeant P.A. Williams were sent to the former Republic of Yugoslavia to train local crews to install the kits. In one month - from 20 March 1993 to 21 April - 70 kits were installed. "The first shields took ten hours to replace but this was due to rain as well as lack of training. The kit boxes were well constructed and hard to open. We had no problem in getting rid of the wood - everyone needed wood and willingly took it off our hands," Warrant Officer Foster recalled. "At each location we had lots of help from the crews who stripped off all the extra gear they had from the top of the carriers and helped install the shields. They seemed to enjoy the change of pace. Everywhere we went, they were very happy to see us and we could well understand. Many of the carriers had marks from shrapnel and the occasional bullet hole."

On 18 October 1993, a M113 APC was engaged by machine gun fire. Two rounds hit the side of the APC and two rounds hit the gun shield. "The rounds hardly scratched the APC's armour," noted UNPROFOR BH Command message OPS514 to Canadian Contingent UNPROFOR dated 21 October 1993. "Without the gun shield, the gunner would definitely have been hit and seriously wounded in the head or thorax."[38] That is accolade enough for all the effort that went into engineering in situ.

The severe road conditions which convoy vehicles were subjected resulted in several casualties. One of the most critical was the failure of the then-newly-acquired HLVW fuel tanker.[39] The failure was first identified by the members of maintenance platoon. Response to their TFR of February 1994 was quick. On 4 May 1994 a staff assistance visit (SAV) team headed by Master Warrant Officer P. Garland arrived at CANLOGBAT. By this time the HLVW refuellers were failing at the rate of one a week.

Master-Corporal M. Gray and Craftsman B. Holmes began the removal of the first tank from the back of an HLVW. They found that the manual given to them for the removal of the tank was for a prototype vehicle and had no relevance to the HLVW in service. They developed their own procedure. Then the team discovered that the equipment they had brought with them was not compatible with the maintenance platoon's 'ancient' welding machine. So SAV technicians, Master-Corporals B. Smith and M. Jackson, developed an entirely new procedure by removing all defective welds and replacing them entirely. The work was extremely difficult to do on the bottom of the tank, so the tank was removed using a 25-ton crane and a nylon sling. Once the tank was on the ground, the sling was reconfigured and the tank was rolled ninety degrees by the crane so that the welders could work standing up. Grinding and welding started immediately and ceased only when the winds grew so strong that the tank swayed during its gusts. Despite

38. Foster, WO D.; *With a C7, Helmet and Flak Jacket*; published in EME Journal 1/94.
39. Poole, LCol S.R., letter from CO LETE to the author, 1994

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winds and stifling heat, the team completed ten HLVW refuellers four days in advance of their forecasted completion date of 15 June 94.[40]

"Tech Assist" Team

The neglected, bombed-out roads and increased usage of the equipment for patrols was very hard on the vehicles and other rolling stock. By early 1994 the maintainers were stuck with a record backlog of inspections. DGLEM sent Lieutenant-Colonel A.W. Price to analyse the situation on the spot. The result was an immediate need to either increase the number of maintainers or form a special team to provide temporary assistance. The latter solution was chosen.

The "Tech Assist" Team was formed within a week, comprising 12 vehicle technicians from bases across Canada including; Halifax, Gagetown, Ottawa, Petawawa, Trenton, Toronto, Winnipeg, Edmonton and Esquimalt. Chief Warrant Officer G. Beaudoin from DGLEM was appointed the leader. The team met for the first time in CFB Trenton while waiting to catch a service flight.

The first part of the mission was CANBAT1 in Gracac, Croatia. The team inspected and repaired 137 wheeled vehicles in 20 days, expending 1,850 hours of labour. They then moved to CANBAT2 in Visoko, Bosnia-Herçegovina where they inspected and repaired 120 wheeled and tracked vehicles in 21 days, expending 2,025 hours. While in Visoko they met Brigadier-General V. Pergat, who was visiting the troops in the former Republic of Yugoslavia as part of the EME 50th Anniversary.

"The vehicle situation was similar in both Croatia and Bosnia. The majority of problems were with brakes and suspension, which are faults usually discovered on 1134/1136 inspections. This could easily be attributed to the roads and the fact the vehicles are racking up to four times the mileage compared to Canada," Chief Beaudoin noted, "The experience was unforgettable. We worked for 45 days on real vehicles, on real problems, in a real war proving once again the viability of the Mobile Repair Team concept - in the year when EME celebrated it's 50th birthday - Arte et Marte!"[41]

UNMOs and Headquarters Staff

Some EME members were been given positions on the staff. "Such jobs gave us a look at the broader picture of military operations," noted Major J.A. Fraser, who served a tour as executive assistant to the chief of staff to the UNPROFOR. Usually an EME officer filled the position of G4 Maint in Canadian Contingent Headquarters. Although based in Zagreb their duties took them to all locations where there were Canadian units. In May 1994 Captain S.J. Brown visited the 2PPCLI maintenance platoon (CANBAT1) in Sveti Roc, Croatia, the maintenance company of CANLOGBAT in Šibenik, Croatia to observe the modification program for the HLVW 10,000-litre fuel pod tanks, and the LdSH(RC) maintenance troop (CANBAT2) in Visoko, Bosnia-Herçegovina to observe the gun shield modification on M113s. Earlier, he had been in Visoko for the Kevlar panel modification project for HLVW trucks. A lot of equipment deficiencies were showing up in Canadian equipment at this time. It was a busy time for him since his job was to facilitate maintenance and modifications and ensure the UCRs got actioned..

Some EME officers served as United Nations Military Observers (UNMOs). One, Captain A.J. Collingwood, served from July 1993 to July 1994. His assignments included Brko in northern Bosnia, Mostar in southern Bosnia-Herçegovina, and Benkovac in Sector South. There were 600 UNMOs from fifteen countries, divided into teams of from 4 to 15 and spread out all over Bosnia, Croatia and Macedonia. For overall control there were small headquarters elements in UNPROFOR and Sector headquarters. The UNMOs lived in the towns where they were assigned, using the same water and eating the same food as the civilian population - and experiencing the shelling of the towns with them. "When the population had no electricity or water, neither did we. It was imperative," noted Captain Collingwood, "that the UN do this for the warring parties. Sometimes it didn't seem to serve much purpose, except to have UNPROFOR's presence on the ground during the shelling - that meant a lot to the people. By the time that I arrived in the former Republic of Yugoslavia, the front lines had been stabilized and defended. There wasn't much mobile

40. The vehicle's 10,000-litre tank was anchored by two trunnions, one at the front and one at the back. Side-to-side motion of the tank was prevented at two points midway along the length of the tank, left and right of the centerline. These supports acted as shock absorbers between the rigid chassis and relatively fragile tank. Severe rocking of the tank during travel on Bosnian roads led to complete compression of the springs that were supposed to absorb the force. This transferred stress to a cross brace which eventually failed tearing it from the tank along a weld. The tank was left with only the support of the trunnions and a tendency to list when turning - a potentially fatal condition.

41. Beaudoin, CWO G.; *Tech Assist Team*; unpublished article, 1994.

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war - mainly sniping incidents in the front lines that too often quickly escalated into shelling each others' towns. Many times we were called on to go into towns during shelling to identify the dead."[3]

When a cease-fire went into effect in Croatia on 29 March 1994, Captain Collingwood was the UNMO team leader in Benkovac, Croatia and CANBAT1 was rotating from 2R22eR to 2PPCLI. The agreement called for each of the two warring sides to pull back one kilometre along the confrontation lines in Sector South. This would separate the two sides and leave a corridor along which UNPROFOR could patrol and maintain surveillance. However, on the Croatian side of the corridor only UNMOs were allowed. Hence, CANBAT1 was eventually moved from the Knin/Gracac area in the Serbian Krajina to Rastevic on the Croatian side of the corridor. But before that could happen, the minefields had to be cleared.

Each side provided engineers to clear the minefield on its side of the corridor. The engineers worked inward under the supervision of UNMOs. Captain Collingwood's team was with the Serbian side. He had CANBAT1's area and half of the Kenyan battalion's area. As they were approaching the middle, a group of three Croatians triggered a mine in front of him. Two managed to crawl away. They left the third. Captain Collingwood went forward, crossed the cease-fire line and tried to render assistance, but the Croatian engineer died. "It was unfortunate," Captain Collingwood recalled. "However, we had his body recovered and carried on." He was awarded the Medal of Bravery.

A Craftsman's Life

Life in the former Republic of Yugoslavia was never easy. Whenever the Craftsmen had a moment to relax, the war was never far away. "We considered ourselves fortunate to have the SAV team in theatre for the Branch Fiftieth Anniversary," Captain Dundon recalled. "Though a much lower-key event than the national celebration, it was just as spirited. There was a real sense of satisfaction being involved in one of the biggest UN operations in years as the branch commemorated its camaraderie and achievements. Regrettably, our 'creeper-races' at the ceremonies were interrupted as teams were called away to assist in the recovery of a Canadian 32-ton tractor that had been involved in what became the biggest accident during our tour."[9]

There were two EME 50th Anniversary celebrations in Visoko. Early in April 1994, before they left for home, the 12RBC maintenance troop, quarantined in their garrison by the warring factions, celebrated the "Olympics of Visoko" with an EME games day on their shop floor. In attendance were ten REME Craftsmen from the Royal Anglians' LAD. The 12RBCs' replacements, the Craftsmen of the Lord Strathcona's Horse (Royal Canadians), had their celebration a month later on May 15th and invited the Anglians' Craftsmen - their second EME 50th Anniversary party![42]

"Everyone had a great time celebrating the Corps' Birthday," noted Captain Gallinger, "despite the two-beer-per-man rule that was in effect during these festivities as well as the whole of our tour. In honour of our Corps support to the regiment, the Commanding Officer allowed the EME flag to be flown for a week in front of the main entrance to the headquarters building beside the UN flag and the regimental flag.[29]

Accommodation was always rough since units were continually being moved. Nothing seemed to be permanent. Duty in isolated pockets or on convoys meant that often many had to make do with what they had where they were at the end of the day. In Camp Polom, for example, the CCSG lived in tents over the first winter. "Once we had the camp set up and could move out of the canvas and had a building to work in and a dry place to sleep, the morale of the camp went up," noted Corporal Harrisson. "There's nothing worse than waking up in the morning and having to pull your bed up out of the mud because it had sunk in so far you were almost sitting in it. We had to pull the tents out too. Mother Nature was also changing for the best so everything was looking better from then on."[20] In the spring of 1993, ATCO shelters and washing facilities were built for the CCSG at Camp Polum.[21] Then, after a year, the unit moved to Primošten.

Two weeks UN leave became very important for soldiers isolated and confined to relatively small camps continually under observation and harassing fire.

"Often the soldiers would come to me or the ET and ask, 'why are we here? Do we make a difference?' We would reply, 'Yes. We need to be here. We're helping. We're keeping the UN presence in Yugoslavia.' We kept saying that and they believed us. But they weren't sure because we were the only ones telling them that," Captain Sanchez recalled. "But then someone else comes and brings them gifts and pins[43]

42. Johnston, Col M.C., *The Canadian Armed Forces' EME Branch and The Corps of REME - a Century of Connections*; The REME Journal, Number 45, 1995; Corps of REME, 1996.
43. In December 1993 the Colonel Commandant visited the CCGS and distributed 50th Anniversary pins to all Craftsmen and 50th Anniversary posters to all units.

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and says, 'I know that you are here and I know that you work hard.' To them it meant that there was someone else besides their bosses who were thinking of them. It made them feel better. They were members of a Branch that looked after them. We had the posters all over. We had our parties. People saw our spirit and wondered, 'How come they are like that?' I guess that they could not understand that we are like we are."[16]

It was the mystique that was RCEME. Forged in war, it reappeared in the mud and travails of the former Republic of Yugoslavia and helped Canada's Craftsmen to maintain a proud record of keeping equipment in operation - under any conditions.

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EVOLUTION AND DEVELOPMENT

The evolution of warfare since the birth of RCEME has been marked by tremendous advances in firepower and mobility. Weapons and equipment of today are much more sophisticated and costly than those of fifty years ago. {In the evolution of these weapons and equipments, often at the forefront of technology, the former discrete domains of electrical, optical. electronic and mechanical engineering have been merged and augmented by others, lasers, computers and nuclear power. }Canada's Craftsmen have helped to develop these new weapons systems. No less important, however, they have helped to develop maintenance tactics and techniques to keep these weapons systems operational on the battlefield {And finally, they have accomplished this in an atmosphere of declining budgets, shifting requirements, frequent reorganization, new tasks and revised priorities.

It has been a continuing engineering challenge}.

Montage: top left to right: - heavy equipment rebuild lines at 202 Workshop Depot, *DND*; winter track maintenance on a D-8 tractor *DND*; repairing a snowblower *DND*; the "White House". *DND*; the RCEME School Band circa 1960. *DND*

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EME in the Arctic. AWD from 23 Composite Workshop on exercise on the Northwest Highway 1951. *DND*.

EME in the Arctic. 223 Workshop, Churchill. *DND*

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Equipment inspection. Checking a runway snowplough. *DND*.

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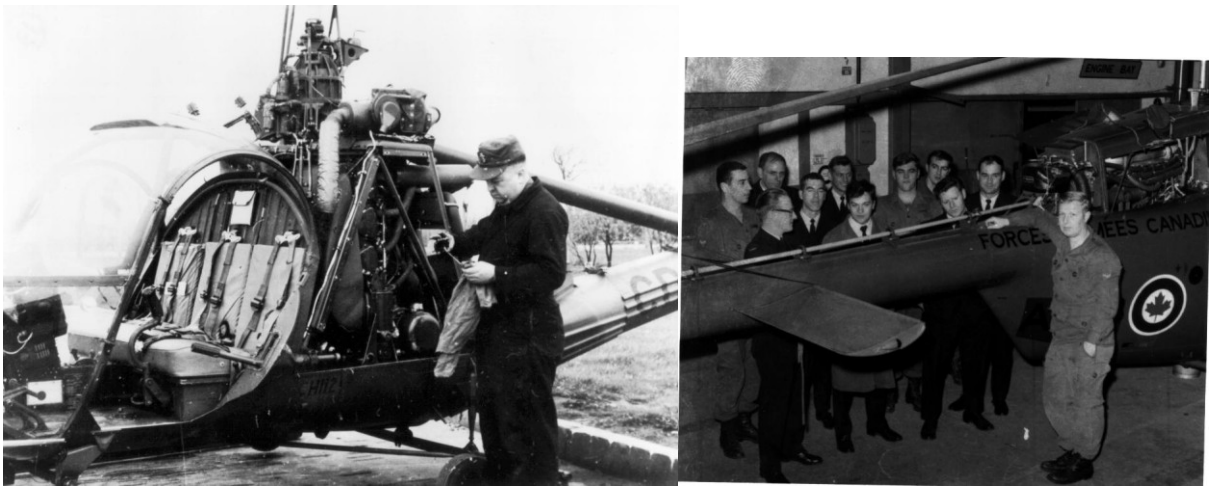
EME in the Arctic. A generator and oversnow ambulance. *DND*.



RCEME aircraft technicians – *left:* Helicopter servicing by a RCEME Aircraft Technician on a CH112. *DND*. *right:* training tradesmen. *DND*.

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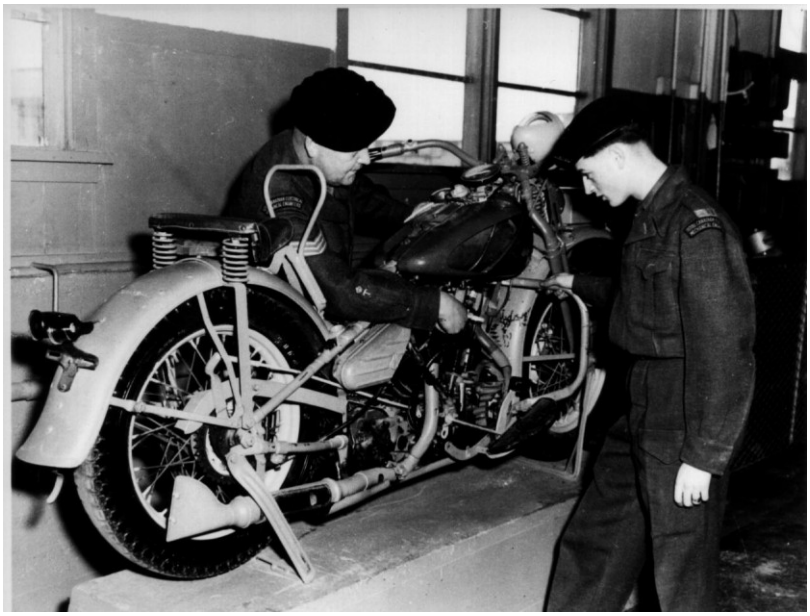

RCEME Apprentice-Soldiers *top:* A Green Monster no more! The Commandant of the RCEME School cuts off the green shoulder stripe of a Craftsman-Apprentice signifying his graduation. *DND*; *bottom:* Craftsman-Apprentice training. Instruction in motorcycle repair. *DND*.

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"RCEME 100-man Workshop" *left:* workshop floor at Winnipeg showing vehicle section in the 1970s. *DND*. *right:* building at Winnipeg in the 1970s. *DND*.

1st Annual EME All-ranks mess dinner, Winnipeg January 25, 1998. *DND*.

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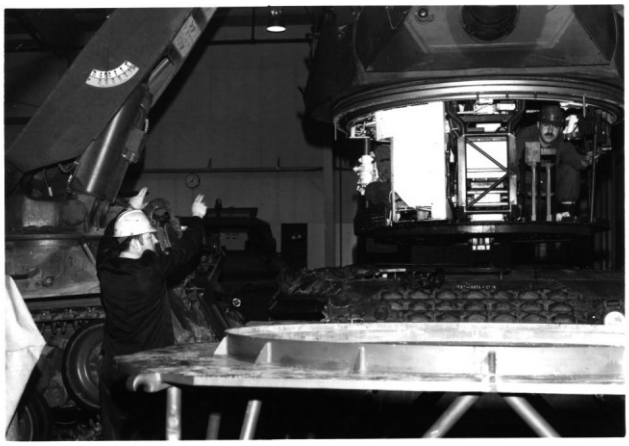
Workshop vehicle hoist. Base Maintenance Borden. *DND*.



Tank overhaul at 202 Workshop Depot. Replacing a Leopard tank turret. *DND*.

Equipment testing at LETE. A Bison AVGP with experimental gun mount on the tilt-table. *DND*.

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12

Chapter 12 - LAND ENGINEERING AND MAINTENANCE SYSTEMS

Pre-Integration Systems, Integration and Unification,
Life Cycle Materiel Management and Project Management Offices,
Equipment Program Management, Maintenance Management and Information Systems

September 16, 1996 the direction and speed of this evolution has been affected by five events: Integration and Unification (1964-86); the introduction of Life Cycle Material Management (LCMM) and the creation of the Director-General Land Engineering and Maintenance (DGLEM) division in 1973; the formation of Project Management Offices in the latter 1970s; the fall of the Berlin Wall in 1989 which marked the end of the Cold War and the start of global military downsizing, and; the combining of engineering, maintenance and procurement functions in forming the Director-General Land Equipment Programs Division Management (DGLEPM) in 1995.

Pre-Integration Systems

Prior to the Second World War, virtually all of the equipment required by the army was purchased from the United Kingdom. The only major exceptions were certain types of ammunition and related components, which were manufactured at Dominion Arsenals at Valcartier, Québec, and Lindsay Arsenals at Lindsay, Ontario. This work was carried out under the direction of the Master General of Ordnance.

At the commencement of the Second World War, initial purchases were still made from UK as well as US sources. With the rapid expansion of the allied forces, however, a very critical shortage of equipment arose. Consequently, Canada became a major producer of equipment, and the Department of Munitions and Supply (DMS) was formed in 1940 to control the production of this equipment. In 1941, the Army Engineering Design Branch was set up within DMS to act as design authority for wheeled vehicles. Design and development in other fields was initiated by various government agencies and, in May 1942, the Army Technical Development Board was established to coordinate that effort. {After the end of the war each of the three services - navy, army and air force - independently developed an equipment engineering and maintenance system that satisfied its own environmental requirements.}

In 1946 the Defence Research Board was set up to coordinate the development activities of the three services and to carry out basic and applied research for all three. This satisfied a need for a permanent research and development organization to keep up with technological advances in every field of warfare. Each of the services was given the responsibility for design and development within its own sphere. In addition, key government-owned production facilities were organized into one crown corporation to be known as Canadian Arsenals Limited. In the Army, design and development was made the responsibility of the Deputy Quartermaster General (Design and Development) (DQMG (D&D)) whose organization included five equipment directorates; vehicles, armament, engineer, electrical, and communication, as well as a directorate for inter-service development.

In 1959, these equipment-oriented directorates were amalgamated into a single directorate - the Directorate of Design and Development (DDD) - and the Army Development Establishment (ADE) was created. In addition, the DQMG (D&D) retained the army element of the Directorate of Inter-Service Development.

The function of development was defined as the process of actual design and construction of at least one prototype of a proposed new or modified piece of equipment in a form suitable for quantity manufacture and subsequent use. Engineering investigation established the feasibility of new concepts and evaluated proposals and new equipment. The design authority wrote purchase descriptions and specifications, provided drawings and sealed samples, engineered and monitored production and authorized production changes when applicable.

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The Directorate of Design and Development coordinated the design and development program and controlled the expenditure of authorized funds. The Army Development Establishment carried out the physical work of design and development referred to it. It was responsible for ensuring that sound engineering was incorporated into all army equipment with regard to both technical performance and production. The Directorate of Inter-Service Development was responsible for the design and development of items of clothing and general stores for all three services. It acted as the design authority in its assigned field, but was subject to final approval by the service or services concerned.

Some of these organizations were redesignated in 1961, although their terms of reference and functions remained unchanged. The DQMQ (D&D) became Deputy Quartermaster-General (Equipment Engineering), ADE became the Army Equipment Engineering Establishment (AEEE) and DDD became the Directorate of Equipment Engineering (DEE).

The maintenance of equipment in the army was the responsibility of the Director of Electrical and Mechanical Engineering (DEME). This responsibility included army aircraft and communications equipment. In the air force and navy, most of the land equipment was vehicles. The engineering, maintenance and operation of vehicles in the air force was carried out by the Directorate of Mobile Support Equipment at Air Force Headquarters, a vehicle test section at Central Experimental and Proving Establishment and by Mobile Support Equipment (MSE) sections at bases. Engineering aspects focused on aircraft and airfield ground support equipment. The engineering, maintenance and operation of vehicles in the navy was the responsibility of the motor transport sections at headquarters and naval bases.

Integration and Unification

Integration of the three services started in 1964 and the organization and systems of the three services were fundamentally changed. It was a time of great uncertainty and many teething problems, as new systems were constantly being introduced, modified ... and scrapped.

Integration of engineering functions began in August 1964 when the DQMG (Equipment Engineering) became the Director General Engineering (Land). In September 1964, the aircraft development staff from DEE and the Aeronautical Division of AEEE were transferred to the Air Member, Technical Services, in Air Force Headquarters to consolidate aircraft technical services. This was the first of a series of reorientations of engineering and development organizations, as part of the creation of Canadian Forces Headquarters. In September 1965, the Development Engineering Section of the Directorate of Mobile Support Equipment and associated naval motor transport staff were incorporated into AEEE.

In November 1965, DEME assumed responsibility for the provision of maintenance support for RCN motor transport. In September 1966, the RCEME procedures and documentation for vehicle maintenance were adopted for the RCAF Mobile Support Equipment (MSE) sections. Concurrently, MSE sections were split with the vehicle operations incorporated into a Base Transportation section and the maintenance activities reorganized into a Base Maintenance (Land) section (BML). At geographic locations where army and air force units were integrated into bases on 1 April 1966, the RCASC transport companies and RCEME workshops were fully combined within the new sections.

There were many teething problems. Lack of mutual understanding of different operational needs, delays in creating integrated supply procedures, and inconsistent trades training and rank progression caused many difficulties, especially for the new combined workshops. Fortunately, the good humour, technical competence and professional pride of the technicians kept the operation going.

The following eight years saw an almost continuous reorganization and redesignation of both the engineering and maintenance organizationsas responsibility shifted from CFHQ to the newly-created Materiel Command, which had a Directorate of Land Maintenance (DLM). On the disbandment of the command, responsibility returned to CFHQ as part of the Deputy Chief Logistics Branch in the Chief of Technical Services group. This was subsequently renamed Deputy Chief Defence Staff (Supply) Branch in the VCDS group and included a Directorate of Ordnance Maintenance (DOM). Finally, in early 1973, the Life Cycle Material Management (LCMM) System was introduced. NDHQ was organized and the engineering and maintenance functions were combined in the Chief of Engineering and Maintenance (CEM) Branch. The Ordnance Engineering System (OES), came into being under the direction of DGLEM, a division within the CEM Branch.

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As the equipment maintenance corps of the Canadian Army, RCEME had had a well-defined responsibility and a full spectrum of personnel skilled in carrying out maintenance of vehicles, electrical equipment, radios and radar, instruments, weapons and aircraft, as well as welders, machinists, clerks and training and regimental personnel.

A similar maintenance focus had not existed in the Navy or Air Force. Their structures were more closely integrated with the individual equipment operations. These divergent organizational philosophies were modified during the 1964-68 time-frame of integration and unification of the Canadian Forces (CF). From this melting pot of often conflicting requirements a CF engineering and maintenance concept was developed. The responsibilities were generally allocated along functional and technological lines and corresponded overall to the "environments." Thus branches - corresponding to their designated officer classifications - undertook engineering and maintenance for appropriate equipment, with other branches responsible for the operation of the equipment. The C&E Branch retained both operators and technicians of communications equipment that were not imbedded in aircraft or ships.

These decisions had a major impact on the responsibilities of the LORE Branch as successor to the Corps of RCEME in its maintenance support to the army. Aircraft tradesmen became part of the AERE Branch as did the workshop trades. Clerks became part of the Personnel Administration Branch and radio and radar tradesmen were re-badged CELE. Nevertheless, with the exception of the aircraft technicians, these tradesmen continued to be employed in BML sections and in first and second line field workshops. The non-LORE tradesmen, however, were also subject to posting to other organizations: radio and radar technicians to support aircraft and strategic communications, workshop tradesmen for employment in aircraft maintenance organizations and clerks to orderly rooms throughout the three environments. The adjustments were challenging and sometimes difficult both technically and culturally. Some could not adapt and served reluctantly or took their release. The majority recognized that a job had to be done and worked cheerfully to make the new system function.

The LORE Branch was made up of four trades and one officer classification. Vehicle technicians, weapon technicians (land) and electro-mechanical technicians were drawn from RCEME and RCAF MSE technicians, and the ammunition technicians were formerly with the RCOC. The LORE officers were primarily from two groups: RCEME officers (the majority) and RCAF MSE engineering officers. A few engineering-oriented officers from the combat and combat support arms and other services also were founding members or joined the Branch shortly after its formation. This latter group included the senior ammunition technical officer of the Branch, Colonel J.A.F. Huot, who served as Director General Ammunition until 1983.

Life Cycle Materiel Management and Project Management Offices

In 1973 the Life Cycle Materiel Management (LCMM) System was introduced and the DGLEM Division formed. This started a period of constantly trying to keep up with the increasing complexity and rapid obsolescence of equipment. By the start of the 1980s the LCMM system could not handle the normal in-service work plus the growing number of capital acquisition programs. Consequently Project Management Offices were introduced. It was a period of conflicting priorities of a recommitment to NATO and a growing demand to spend less on the military.

It was soon recognized that the engineering and maintenance responsibilities of the LCMM System were not being addressed in the most effective manner. Technical advances, need for equipment specialization, conflicting environmental employment and training requirements and the unique operational commitments of the OES made changes essential.

The climate, for many years, was not supportive of these necessary modifications. Despite the best efforts of members of the Branch, progress was slow and there were many setbacks. Limited funds, reduced manpower, aging equipment and a reluctance to make further changes after the traumatic events of the late 1960s all combined to restrict the development of the LCMM system. Recruiting and retention rates for officers and technicians were low and the ammunition technicians were transferred to the Logistics Branch in 1978. (Nevertheless, several dozen EME Officers have trained and qualified as ammunition technical officers (ATOs)).

In the latter 1970s the situation started to turn around. New tanks, trucks missiles, fire control

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systems, radios and AAGSE equipment were procured. Computer assistance became available for equipment engineering and maintenance management. Improved recruiting and training, including post-graduate programs for officers, began to have an impact. Doctrine manuals, long neglected, were dusted off and updated or rewritten. Information systems were redesigned. Fundamental studies to investigate, identify and resolve the myriad of concerns of the OES were initiated. The recommendations of many of these studies are now reaching implementation. The occupational analysis of the LORE trades recommended the creation of a new 400-series workshop trade to support the OES workshops. The ELM technician trade has been expanded and incorporates current electronic and optronic knowledge and skills as part of a new fire control systems technician career field. Recruiting is up in both quantity and quality while retention of qualified engineers and technicians is high.

An important aspect of these efforts and closely associated with the major re-equipment projects of the last few years is the requirement for managers and staff for equipment acquisition projects as part of the LCMM system. Many members of LORE have been fully involved in these projects.

The first new equipment buy that was managed by the OES was the ¾-ton truck replacement project, which resulted in the 1976 acquisition of the 1¼-ton GM trucks manufactured in Canada with CF modifications. The project manager was Lieutenant-Colonel P.H. North. Concurrent with this project was the identification of a replacement for the Centurion tank. Initially, a lighter direct fire support vehicle was approved, but eventually a main battle tank was authorized and a project team headed by Lieutenant-Colonel D.V. Hampson acquired the current fleet of Leopard tanks and associated variants. The direct fire support vehicle requirement was retained and evolved under the direction of Mr R.W. Libbey, a retired LORE officer, as the Armoured Vehicle General Purpose (AVGP) project. This was a major Canadian industrial success since the vehicles were of Swiss design, but manufactured in Canada at Diesel Division General Motors in London, Ontario.

The project team was able to provide a great deal of assistance (repair parts scaling and demonstration teams) to the manufacturer. In early 1982, two AVGPs along with vehicles from five other countries underwent competitive trials for the Egyptian Army in the northwestern desert areas of that country. At one point during the test, one of the Canadian vehicles - while proceeding at 80 kilometres per hour across a flat desert area - plunged into a wide, deep, hidden trench, severely damaging the suspension of the vehicle. Sergeant D. Burritt, a member of the demonstration team, directed the recovery of the vehicle. While parts were being obtained (an 800-kilometre jaunt to Cairo and back), he readied the vehicle for replacement of both front suspension units and all major steering components. Six hours work and one day later the vehicle was back in the desert resuming the trial. The Egyptians were impressed with the reparability of the vehicle as well as the teamwork of the project demonstration team.

The 2½-ton truck also was also due for replacement in the early 1970s and a search for a replacement began in 1975. In 1977, a US Army truck was selected to be built by Bombardier Inc. in Valcourt, Québec under licence from the American manufacturer. Two features of this project, named the Medium Logistic Vehicle Wheeled (MLVW), were the system design, and incorporation of RAMD (Reliability, Availability, Maintainability and Durability) into the vehicle's specification. The system design approach featured two basic chassis which can be used interchangeably as cargo trucks or Specially Equipped Vehicles (SEVs). For the first time, as a result of initiatives of reliability trained officers including Major F.G. Parsons, the army incorporated RAMD criteria in a wheeled military vehicle specification. In a three-month test in 1982, conducted by Captain J.J.M. Grondin and Warrant Officer J.P.E. Bizier, five randomly-selected production vehicles verified vehicle performance against specified RAMD parameters. The vehicles exceeded the specification by attaining a projected average of over 10,000 kilometres between failures. In addition, the test led to some 40 modifications to improve vehicle design and performance. (Of special note is that the trial also included four VW Iltis vehicles, the replacement for the jeep. The test indicated the requirement for development work well before the vehicle was scheduled to go into production).

In the weapons field, the major engineering and development activity has been in the Small Arms Replacement Project (SARP). This project started in 1977 to select a new standard NATO small arms ammunition as a successor to the 7.62 mm round and, if possible, a standard rifle and light machine gun. A major achievement in the selection process was the ADP integration of evaluation data, which combined computer control of endurance and precision test firings and troop trial data input, into a central computer

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for subsequent analysis. ADP system design and software production was done by LORE officers. Agreement on a 5.56mm weapon system was made consisting of C7 rifles, C8 carbines, C9 light machine guns (LMG), operational and initial training stocks of 5.56mm ammunition, logistics support items and training accessories.

In the world of target acquisition, fire control systems and tactical computers, a similar engineering and acquisition activity has been undertaken either as part of new weapons system - such as Leopard and AVGP - or as enhancements to existing weapons systems such as the Military Portable Artillery Computer (MiliPAC). Developed under the technical authority of LORE personnel by the Ottawa-based firm Computing Devices of Canada, the MiliPAC interfaces with the Gun Alignment and Control System (GACS) for automatic transmission of gun firing data to the guns via line or radio. GACS is also a Canadian-developed equipment, designed by Aviation Electric Limited of Montréal under the technical authority of LORE personnel. Continuing in-service support to these equipments will be provided by the Land Forces Software Support Centre established by DGLEM to provide level three and level four software maintenance. This facility represents a new dimension in ordnance engineering maintenance technology and will expand with the increasing impact of micro-processors on the military environment.

By the mid-1970s, Life Cycle Materiel Managers (LCMMs) were finding that often they could not meet all of their obligations, i.e. day-to day support to the field as well as engineering and development projects. This problem became critical with the 1¼-ton truck project. The special equipment vehicle (SEV) section of DLMSEM was too small to effectively manage the SEV part of the project. (Note: DLMSEM was later split to form DSVEM and DCMEM.) Contracting through DSS was considered, but the requirements of the normal contract system were also beyond the capabilities of the section. Additional personnel could have been provided through personnel services contracts, but this would have required a convenient industrial base which did not exist in Ottawa. Finally, the normal close co-operation between the DLMSEM project officer and LETE test officer could not be used because of staff reductions at LETE. Hence, it was necessary to look to local civilian firms.

Initially, Hovey and Associates, because it employed several ex-military personnel who understood the special demands of military requirements of equipment, was contracted to do some engineering and development tasks using capital funds. The results were satisfactory, but staffing capital-funded contracts was too slow.

However, an arrangement was made between DLMSEM and DSS contracting officer Mr R.W. Shaw, a former RCEME officer, in which DSS agreed to delegate contract taskings to DLMSEM. The contract was with Hovey and Associates and provided engineering, development and prototype manufacturing support for the numerous 1¼-ton SEV Kits. This proved to be a successful and effective way of providing LCMM support.

Following the end of the 1¼-ton project, the tasking arrangements used for that project were first extended to general engineering services contracts for the original company, then to DEW Engineering and Development, Davis Engineering, and TES Limited. This added the element of competitive bidding to tasking selection. Finally, the contracts were extended to all mobility equipment supported by DGLEM and were consequently renamed MEMET (Mobility Equipment and Minor Engineering Tasks) contracts, and now provide a broad range of engineering services and technical support on an as-required basis. The MEMET contracts not only help provide LCMMs with an additional flexible resource, but have two other advantages; that of sharpening up the engineering and industrial expertise of EME officers and technicians as well as that of developing the expertise of civilian companies in the engineering requirements of military equipment.

{In 1995, as part of overall DND downsizing, the project management offices were gradually closed.}

Equipment Program Management

In 1989, Critical Review 90 saw the elimination of most army equipment projects, the closure of army bases and the reduction of service support trades. The EME Branch encouraged the chain of command to reduce equipment inventories, controlled equipment usage, increased contracting, increased workshop productivity and expanded the training and use of the EME reserves. A recommitment to NATO resulted in

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the formation of many project offices and an expansion of training resource requirements. The decision to field the 1st Canadian Division required that the mobilization base in Canada be expanded and that the EME reserves become responsive to new requirements. The service battalion system in the militia was updated and joint field training on local initiatives between regular and reserve battalions started.[1]

As the 1990s started, the Cold War ended and immediately produced a demand for a "peace dividend," i.e. massive reductions in military spending. At the same time there were unprecedented demands for soldiers to make and keep the peace in situations of ever-increasing intensity and violence. Peacekeeping had become a near-war type of operation that was heavily dependent on equipment. This severely strained defence budgets and put an emphasis on efficiency and getting rid of redundancy.

In the Materiel Group of NDHQ, Operation Excelerate searched for a whole new way of doing business. As a result, in 1995 the DGLEM and DGProcS[2] Divisions were disbanded. Their functions of procurement and LCMM for land equipment were amalgamated in a new Director-General Land Equipment Programs Management Division in 1995.

The Equipment Program Management (EPM) concept is a component of the EME mandate to re-engineer the material acquisition and support business to improve cost-effectiveness, while maintaining service quality. The EPM concept means that a team of equipment system managers with skill sets in engineering, maintenance, supply, procurement and finance - all working under the same umbrella and to the same agenda for a specific equipment fleet - will provide clients with a single point of contact. Over the short term, expertise and resources have been consolidated in each of the teams as of September 1995. Over the long term, consolidated expertise will be strengthened and perpetuated within the teams through the use of multi-skilled generalist staffs of equipment system managers. Duplication has been eliminated through detailed equipment mapping conducted through consultation between teams and clients. Directorates will work in teams/groups which are flexible and can be reorganized on short notice based on business plans, resource allocations and client responsiveness.[3]

Maintenance Management and Information Systems

At the time of the CF integration in 1968, RCEME had a well-developed, manually-operated workshop management system. Nicknamed the "2149 system" after the work order form, EMERs K02 and K03 described its operation and provided tips to workshop managers. As a secondary function, some data was gathered for headquarters.

By the early 1970s the data gathering function was automated as Land Ordnance Maintenance Management Information System (LOMMIS) and a new work order, the 1020, was introduced.[4] This was a period of major cuts in the armed forces, so as a matter of survival, the LOMMIS data gathered soon was used primarily to substantiate positions in workshops. Data gathering, however, quickly became the driving force of the LOMMIS system and the workshop management side was neglected.

A major aspect of data gathering was full-time accounting by all workshops. This was an onerous function of little direct or immediate use to workshop managers, so by the mid-1970s time accounting was relaxed to sampling. The data received were sharply reduced in quality and quantity ... and in usefulness. Full time accounting was re-introduced in the late 1970s.

In 1978, a Base Static Automated Maintenance System (BSAMS) project was initiated on a trial basis in CFB Petawawa by Major M.G. Masuda. The trial indicated that there were gains to be made and identified significant gaps in the policy and procedures for managing workshops. By 1981 the trial had become part of a larger Base ADP Project, was renamed Base Static Administrative and Maintenance Management System (BSAMMS), and was assigned to Captain J.C. Giroux and Chief Warrant Officer K. Matacheski.[5]

At that time each workshop had its own process and some workshops had over a hundred locally-designed forms! Performance measuring/monitoring was almost non-existent, so the project team analysed work by function and developed a workshop management concept. That the system should be a tool to assist workshop managers, and that the information needed by commands and NDHQ would be a by-product,

1. Redman, LCol D.N.; Notes on maintenance management 1989-95; 1995.
2. *Overview of Project C-7: The Levels of Reengineering Initiatives*; DGLEPM briefing, 1995.
3. *Overview of Project C-7*; DGLEPM briefing 1995
4. Kirkland, LCol K.W.; taped interview with the author, 1995.
5. Kirkland, LCol K.W.; *Historical Summary - Land Maintenance Information Systems*; unpublished notes, 1995.

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were fundamental design principles. Another was that there could only be one system, i.e. the system designed for static workshops had to be field deployable and usable.

A policy book, Maintenance in Static Operations, was written and the Manual Maintenance Management System (MMMS) was developed.

By 1985, a prototype workshop management system had been developed and a trial begun at Winnipeg and Gagetown. Due to programming faults the system was unacceptably slow as data accumulated. Technology changes required that the program be rewritten, but budget constraints required that functionality be removed from the design. This was unacceptable, so DLES proceeded on its own to design and implement the MMMS(A) system, which has been incrementally improved over the years. About 1990, the name was changed to Workshop Management System (WMS).

By the mid-1990s progress on the project was still not satisfactory. Many workshops felt that the WMS served headquarters and not the workshops as originally intended. Some started experimenting with their own internal systems. In Base Maintenance CFB Borden, Sergeant B. McNeill, a vehicle technician, and Mr. R. Thomas, a civilian employee, started an electronic job register of what jobs were in the section and when they were required. They laboured extensively on their own time to pull it all together. From there the project developed to electronically link all steps in work progress from the time a job came in the front door to closing the work out. The register had become an electronic work order. "We had automated the work flow that existed in the shop," Major T.M. McNutt later noted. "The beauty of it was that we were not duplicating anything else. We had an up-to-date data base, which we could study and use to make decisions to improve our service."[6]

6. McNutt, Maj T.M.; taped interview with the author, 1995.

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Chapter 13 - MAINTENANCE IN THE FIELD

Field Operations, Workshops and Service Battalion Maintenance Companies,
LADs and Maintenance Platoons, BEMEs and G4s, Mobile Repair Teams,
Summer Concentrations and RVs, Forward Operating Locations

Keeping equipment operationally fit in battle or for battle is the aim of EME. However, in the half century since the end of World War Two the operational scenario has been one of constant change. The Cold War buildup of the 1950s became the global nuclear war threat of the 1970s and, with the fall of the Berlin Wall, became the international instability of the 1990s (see page 294). For Canada's Craftsmen field operations have been a half-century of constant evolution of maintenance methods, training, equipment, organizations. {The 4-ton Diamond-T wrecker of the 1940s has become the 10-ton HLVW wrecker of the 1990s. Instrument-makers and electricians of the 1950s have become the fire control systems technicians of the 1990s. Field workshops, LADs, BEMEs, and summer concentrations have become maintenance companies, maintenance platoons, G4s and RVs.}

Field Operations

The nuclear threat and technical advances dominated operational planning until 1990. This led to emphasis on firepower, movement, wide dispersion and personal protection. As a result of technological improvements and reliability of equipment, the firepower of a unit to-day is about three or four times that of its World War Two equivalent. It has led to a continually growing dependence on equipment. In World War Two weapons assisted soldiers. To-day many soldiers serve weapons.

Even though Canada's forces have remained small, the level of tactical thinking has remained high so that Canadians can operate with other nations' forces. Summer concentrations on a brigade basis have become RVs on a divisional basis. In the 1970s deterrence of global war required commitment of increased defence resources for NATO - a time when Canada had no more troops to put in place. So contingency plans were drawn up for a Canadian Air-Sea Transportable (CAST) Combat Group and an ACE Mobile Battalion to meet Canada's increased commitments on a contingency basis. The Airborne Regiment was formed in 1968 to give Canada a quick-reaction force capability.

Arising from this operational evolution are two key points. The first is the trend for in-situ repair - under fire if necessary. The second is that EME technicians cannot be mere technicians. They must be soldier-technicians - ready to fight as well as ready to keep equipment fit for battle.

There has been a corresponding evolution in air operations. Tactical helicopter squadrons must operate from mobile bases in the field and jet fighters must operate from austere, isolated airfields called Forward Operating Locations (FOL).

Equipment shortages and currency have constrained the ability to do realistic training - particularly in Canada. In 1981 in Germany the Forward Repair Group (FRG) had its war establishment, i.e. all the fitters' APCs, wheeled MRTs, and 2½-ton SMP shop vans that it was supposed to have. In Canada it was different. There was only a peacetime establishment, i.e. enough equipment for a FRG Section. Field training was limited and not very realistic.

Things changed after 1984 as the new MLVW SEV Kits - shop vans and MRT vehicles - were introduced. All service battalions in Germany and Canada got a full complement. "All of a sudden," recalls Major J.C.D. Turmel, "We had an FRG and a vehicle platoon in Canada. We could do realistic training. We got the people to go with the equipment. We had proper weapon's MRTs and machine shop trucks. The work that we could only do before in garrison, we could do in the field. The morale of the craftsmen shot

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up."[1]

With the HLVW Heavy MRT vehicle, M109 howitzers and the Leopard tank can be fully supported in the field. The LSVW shop van helped too for first-line repairs. Instead of having a cargo truck with a tarp and a door, the first-line technician now has a properly organized and equipped mobile workshop. The design of these vans include many ideas from working technicians, e.g. outside access to some of the on-board storage and air tools. It makes the technician more productive in the field. He can work more easily and faster.

{Innovation has always been a factor in improving working conditions. For example, in Exercise Hiver Rouge in February 1985, Major Turmel recalls, "My technicians were working in -40°C with no tent, no tarp, no nothing. They had two heaters (Herman-Nelson) directed toward their hands just to keep them from freezing. That summer we issued each MRT with a section of modular tent. Then we designed tarpaulins that would fit at the ends and over the back of the MRT vehicle and the front of the vehicle being worked on. We tested them on the parking lot by the workshop. The next January when these were set up in -40°C weather and the enclosure heated the technicians could take their coats off to work. Again ease and speed of work was improved - and productivity.}

Workshops and Service Battalion Maintenance Companies

A large active field force was not originally included in Canada's plans for a postwar army. By 1949, there was only one full time regular force brigade - 23 Composite Brigade Group in Petawawa, Ontario. However, international events and the country's commitments to both the UN and NATO led to the formation of 25 Canadian Infantry Brigade (CIB) for Korea in 1950 and 27 CIB for NATO in 1951. This caused rapid expansion in the support elements and led to the creation of 191 Canadian Infantry Workshop for Korea and 194 for Germany.[2]

Formation of Field Workshops. By the end of 1953, 1st Canadian Infantry Division[3] had been re-created to meet Canada's NATO commitment. Canada now had four brigades - three for NATO and one in Korea. 40, 41, 42 and 43 Infantry Workshops were formed as workshops for these brigades.

1 Canadian Infantry Brigade was sent to Germany. Brigades were rotated every two years with 2 Canadian Infantry Brigade Group[4] (2CIBG) rotating in 1955 and in 1957. From that date rotations to CFE were on a unit and/or individual basis. With the introduction of the M113 APC in 1964, 4CIBG became 4 Canadian Mechanized Brigade Group[5] (4CMBG) until it was disbanded in 1994 on the close out of Canadian Forces Europe.

In 1958 the designations of the infantry workshops were changed. They became field workshops and each took the number of the brigade it was part of. {These numbers survive today in the titles of the maintenance companies of 1, 2, and 5 Service Battalions.}[6,7]

Formation of Service Battalions. By the early 1960's NATO had become well established and the nuclear threat was very real - particularly with the development of tactical nuclear weapons. This led to tactics which required wider dispersion, better command and control, and greater flexibility on the battlefield. This plus the desire to promote inter-unit coordination and reduce inter-service rivalries, prompted the service battalion trials.

Trials for the service battalion concept took place in three definable periods - 1960-62, 1963, and 1964-68. Preliminary trials were conducted during summer concentrations at Camp Wainwright, Alberta from 1960 to 1962. The various service support units, including the ordnance field park, the field workshop, and the transport company, formed a single coordinated logistics organization called a logistics battalion, and referred to in typical soldier style as the "Log Bun"! The preliminary reports from Wainwright were promising. This led to the decision to form the Experimental Brigade Service (EBS) Battalion, as part of 3

1. Turmel, Maj J.C.D.; taped interview with the author, 1994.
2. RCEME Quarterly 2/3, page 9.
3. Since World War One the divisional colour for 1st Canadian Infantry Division has been red as reflected in the arm patch worn by soldiers assigned to the division's units.
4. Because the Canadian Infantry Brigades also included major artillery, armoured, engineer as well as company-sized ancillary units they were redesignated Canadian Infantry Brigade Groups.
5. Nicks, D.A.; *Canadian Forces Base Lahr 1967-92*; Department of National Defence, 1992, pages 33-37.
6. In the early 1970s 3 Brigade Group gradually became a training formation. Consequently 3 Service Battalion was disbanded on 1 April 1976. Its Maintenance Company survives as Maintenance Company for the Combat Training Centre and after 202 Workshop Depot is the largest land maintenance organization in the Canadian Forces.
7. 4 Combat Group was disbanded when Canadian Forces was closed in 1994. It has not been replaced.

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CIBG at Camp Gagetown, New Brunswick, on 1 April 1963. Lieutenant-Colonel M.l. Walton was the Commanding Officer as well as the Trial Officer. He organized and conducted a series of tests and exercises over a two-year period.[8]

As the EBS battalion was formed, the former service units it was to replace were disbanded and their personnel were transferred to the new battalion. The trial directive issued on 3 April 1963[8] gave Lieutenant-Colonel Walton two months to organize his new unit before it commenced its first exercise. Formed on 5 May 1963[9], the EBS battalion moved to the field on 14 June 1963. It was unpractised and deficient in stores and equipment but still took on its full support commitments. That day, is recognized by all service battalions as their official birthday.[8]

That first summer concentration confirmed the validity of the service battalion concept. It gave the brigade commander simplicity of command while greatly improving the planning of administrative support. For the arms units, it simplified administrative support through the employment of a single logistics agency with a common system of service support. The service battalion concept simplified procedures by grouping all the service support elements under one commanding officer. It lent flexibility and speed to administrative support that far surpassed all previous organizations.

Although the findings of the trial were not implemented completely as written, the concept was approved. Service battalions were formed based on one per brigade and one per major militia district. The regular force service battalions were formed between 1968 and 1969. Each battalion was given its brigade's number. numbered to reflect the brigade it supported. 1 Service Battalion was formed on 1 September 1968[10] and 4 Service Battalion was formed on 1 April 1969.[8]

Workshop Life. The skilled craftsmen in these workshops consistently performed admirably, employing ingenuity during adverse conditions. Too often unnoticed, they laboured long hours during exercises in order to ensure operational readiness of equipment. This spirit is exemplified in a recovery task assigned to 23 Composite Brigade Group Workshop, Petawawa in February 1952. Two tanks of the Royal Canadian Dragoons returning from a training exercise had become mired in a bog near Little Tucker Creek. Both tanks were completely immobilized, one on its side with the drivers' hatch below water and the other nosed into a hole with the driver's compartment hatch just at water level. Working in freezing conditions, RCEME personnel using two TD18 tractor winches were able to pull the nosed-in tank from the hole. The second one was not so easy. All hooks were completely submerged in the icy water. A gallant attempt by the RCD troop leader to locate the hooks ended in failure. Stripped to his shorts he entered the frigid water only to be driven back by the freezing cold. On the following day steel cables were brought to the location and another recovery attempt was made. After a broken clevis clamp and tank cable, the craftsmen resorted to field ingenuity. A rearrangement was made and cables were hooked on the rear lifting hooks. This pull was partially successful in that the tank moved and was pulled out until about ten tons of mud broke the towing cable and lifting hook. The tank failed to start tracking over the mud, so axes and shovels were used to clear the towing eyes at the rear of the tank. A tank cable was then hooked on to the towing eyes and passed through a block to ensure that the cable had no sharp bends. A four-to-one pulley system, pulled the tank clear of the debris, but it was still on soft ground. Maintenance personnel quickly re-arranged the recovery equipment and pulled the tank to safety.[11]

To-day recovery platoons still get called, "to give a little nudge or budge or sometimes to drag 'buddy' all the way home." Sometimes they get called for a more interesting recovery task.[12] For example, in November 1990, during a 1 Transportation Company road move over a three-metre wide dirt road cut into the side of a 55° slope in a forested area, a new HLVW truck lost its footing. It slid off the road only to be caught harmlessly and held upright by a strong sympathetic tree. A thorough inspection of the area revealed no place for a deadman anchor. As well, other vehicles could not be placed along side the casualty without chopping down trees - a Forestry Department concern. Then it started to snow.

Meanwhile Chief Warrant Officer T. Hogg, ETSM of 1 Service Battalion's Maintenance Company made his plans. It took two days to dig a deadman anchor - by hand - into a very unaccommodating rocky

8. Lycon, Capt J.A.; *Ubique Quandoque - A History of 4 service Battalion*; 1992, pages 1-5.
9. *3 Service Battalion*; unpublished historical report, 1994.
10. Conrad, John; *Officium Super Omnia; the History of 1 Service Battalion*; Calgary, 1993, page 55.
11. RCEME Quarterly 4/3, page 24.
12. Aitken, Lt A.; *A More Interesting Recovery Task*; EME Journal 1/91, page 18.

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mountainside. One more day and all the cable was laid, safety chains were hooked up, and recovery vehicles in place. A 3:1 indirect pull from the wrecker's 20-ton winch was used. The deadman anchor easily handled the 17-ton initial strain and the HLVW slid back up on the road without difficulty. Transportation company were happy to get their new truck back - undamaged - and the young craftsmen learned a few more tricks from an old master.

On the soldier side of workshop life, EME technicians have participated in a variety of training exercises. For example, Exercise Reliant Nordic in Igloolik Island, N.W.T. in November 1990 was designed to demonstrate Canada's commitment to the arctic and to train personnel in arctic operations. Activities included training with the Northern Rangers, a range practice and meeting local residents. The 94 participants[13], mainly from 1 Service Battalion, were under command of Major K.E. Jones. The exercise started off with five days of training and preparations in Calgary to ensure that all personnel and kit were ready. The deployment to Igloolik started by bus to Edmonton and then a four to five hour flight by CC130 Hercules aircraft.

The first two days were spent near the airport perfecting tent routine and setting up. The group then moved to a base camp north of the village from which activities - including ice fishing, igloo building and a live fire exercise - were conducted for the next six days. While in the community, the exercise participants took part in a parade which invested four new rangers They also provided assistance to the local cadet corps which afforded time for the soldiers and residents to meet and learn more of each other's culture. It was a unique opportunity to travel in the arctic and experience a different lifestyle.[14]

Field workshop activities in NATO were different because the unit worked in its potential theatre of operations and its personnel learned to adapt to the role of being a mobile maintenance formation. The German countryside presented maintenance commanders with a real challenge. As Captain J.I. Hanson pointed out in 1968, "Germany offers the workshop commander a variety of possible workshop sites. Any piece of German real estate large enough for a Brigade Administrative Area (BAA) invariably contains several patches of forest, and several towns and villages of various sizes. However, only a few locations in the BAA lend themselves to workshop requirements."[15]

Working in Germany provided many interesting challenges for the craftsmen. Village deployments presented the problem of dealing with the civilian population, but made excellent tactical sense since villages were well equipped to accommodate maintenance organizations in large barns and buildings. Here also, the craftsman learned to perform his trade with realism. Working arm in arm with NATO partners, RCEME personnel developed a keen sense of awareness of a co-operative spirit. Parts were often interchanged between partners with similar equipment and exchange of maintenance personnel was often practised.

Germany also offered the soldier technicians a chance to demonstrate their military skills. For example, during Exercise Vigilant Badger IV in 1980, the Main Repair Group (MRG) of the maintenance company was deployed in a small village when a heliborne assault was inserted into the BAA to disrupt combat service support operations. A force of enemy helicopters dropped a company of infantry behind a clump of trees about one kilometre south of the village that the MRG occupied. "At dawn our sentries picked up the enemy troops moving through the cornfields towards us," recalls Captain T. Morgan. "The alarm was sounded and our personnel stood-to ... fire echoed throughout the village and our attack went well ... the umpires stated that the maintenance company had definitely broken up the enemy incursion and successfully defended the village. They were particularly impressed by our responsiveness and preparedness for the attack and said it would have taken a battalion to dislodge us."[16]

Light Aid Detachments (LADs) and Maintenance Platoons

After the Second World War, the policy of providing first line support to the armoured, artillery and infantry regiments and battalions was still in the transition phase, with armour, artillery, engineers and signals corps still retaining their own artificers for owner/driver and limited first line maintenance. These units were assisted by LADs which were limited in size and number. For example, 27 CIB went to Europe with 194

13. There were 28 maintainers including Capt Holliday, the REME Exchange Officer.
14. McLarty, Lt R.A.; *Ex Reliant Nordic*; EME Tech Bulletin 1/92.
15. RCEME Technical Bulletin 13/3, page 18.
16. Service Battalion Newsletter November 1980, page 115.

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Infantry Workshop and two LADs, 196 and 197, each with a strength of less than 20 tradesmen to support all units of the brigade.

In 1953, however, came the long awaited implementation of Phase 2 RCEME, in which unit mechanics were transferred to RCEME as had been recommended in the Beveridge Report of 1941 (see page 267). This change in policy grouped all first-line maintenance personnel into LADs. Brigades gained a LAD - in the case of 27 CIB, 195 LAD - as each artillery and armoured regiment had a LAD dedicated to it, while the infantry battalions, signals squadron, and engineer field squadron shared the resources of the infantry brigade group LAD. The RCASC vehicle mechanics also were transferred to RCEME, while the workshop platoons in which they worked were retained in the field and static transport companies.

A number of factors, however, led to the demise of the LAD system ten years later. Firstly, the increasing number and complexity of equipment held by infantry battalions created a demand for integral first-line maintenance services in these units. Combined with both peacetime and the planned wartime dispersion of units, this made it increasingly difficult for one LAD to serve more than one unit. Secondly, the status of LAD commanders as COs created the inevitable tensions between unit COs and LAD COs. The chief loser in such disputes was the spirit of cooperation and good relations essential to an efficient fighting force. Finally, there were a number of minor points on administration and establishments that pointed out how cumbersome the LAD system had become[17].

On 1 August 1963, all LADs on strength of the Canadian Army (Regular) were disbanded. To emphasize that the real responsibility for maintenance now lay with the operational commander, and that he now had all of the necessary resources integral to his unit, Captain W.J. Shearing, the last CO of 3 RCHA LAD, presented two shields to his unit, the 3 RCHA LAD Shield for Vehicles and the 3 RCHA LAD Shield for Guns. "It was our real aim" recalls Captain Shearing, "in presenting these shields; to provide an incentive for those who have to spend many hours working on equipment, to provide recognition for those who worked the hardest, and to provide a small reminder to the regiment of the LAD which gave faithful service until its death was caused by an SD letter[18]."

Some three years later Lieutenant H.P. Martel, OC of the maintenance platoon in 2 R22eR, noted three areas where maintenance platoons were deficient; communications (inadequate radios), spare parts (not enough and where to put them), and tracked vehicles (how do you keep up with an APC when you have a wheeled vehicle?). The strength of the integral maintenance concept was also its weakness, as the unit CO would have had to take away from his "bayonet" strength to add to his "administrative tail" in order to satisfy the maintenance platoons needs[19].

However, this did not blunt the enthusiasm of maintenance platoon members, as noted, for example, by the CO of the Royal Canadian Dragoons in praising the excellent work done by his maintenance troop in helping the unit win the Canadian Army Trophy shoot in April 1977. With only three months to make the switch from the Centurion to Leopard tanks, the maintenance personnel worked nights and weekends to ensure that the tanks were in the best possible condition for this important competition. "The success of the RCD conversion programme from Centurion to Leopard A2," he recalls, "was due in large measure to the hard work and tremendous cooperation of all maintenance personnel."

Captain A. Thibert of 1R22eR Maintenance Platoon noted, "Recurring successes in annual inspections, high equipment serviceability and low user maintenance faults indicate an excellent working relationship between user and maintainer." It remains the goal of all unit maintenance platoons. The 35-person platoon had a dependency of 130 tracked vehicles, 83 wheeled vehicles, 58 trailers, and 31 generators. The platoon used a mix of centralized and decentralized maintenance. Each company had an attached tracked MRT when on exercise. There were also five wheeled MRTs which were controlled centrally.[20]

"Probably the most unique aspect of 4 CER is the unusual types of equipment it has such as a Saturn Crane, Leopard Bridge Layers, Volvo Grader and a ROTORK boat. Parts procurement and the maintainability of these unique equipments presented a tremendous challenge to us," Capt N.R. Bradley noted in 1985. Operational readiness was attained by both technicians and operators. Tuesday mornings were dedicated to operator maintenance. Each operator checked all areas of his vehicle using a four-week

17. RCEME Technical Bulletin 9/3, page 20.
18. RCEME Technical Bulletin 12/1, page 23.
19. RCEME Technical Bulletin 12/1; page 23.
20. Thibert, Capt A.; *Maintenance Platoon 1R22eR*; EME Tech Bulletin 2/85.

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inspection checklist. On the fifth week he checked other equipment such as weapons, small engines etc. Then the cycle began over. Additionally, there were periodic intensive maintenance days, usually before or after an exercise. Maintenance troop also conducted maintenance courses for all officers. The aim was to familiarize them with PM indicators. Troop commanders could then use that knowledge to ensure their personnel were doing the proper maintenance checks."[21]

{**The Airborne Maintenance Platoon.** The 32 members of the Airborne Maintenance Platoon had a stout work ethic recalls Captain D.H. Duncan, the platoon's last commander. "Many fine maintainers have looked skyward to a blossoming canopy and have known the relief of being able to run off the drop zone. But many evenings and weekends have been spent ensuring the fitness of equipment before exercises. In the arctic, many a cold, cold night was passed rejuvenating generators and stoves, while in the desert or jungle, dust and humidity made repairing drop damaged equipment more interesting. The platoon not only did maintenance but much paratrooping, supplying jumpmasters, drop zone controllers, aerial delivery riggers and even parachute instructors."[22] Because the regiment had a lot of over snow equipment, light equipment and small arms, we had four weapons technicians (other platoons had two)," notes Master Warrant Officer D. McFarling. "Winter exercises were often at the commando level. So we had skidoos for our MRTs."[23] On 23 January 1995 the airborne regiment was removed from the order of battle. The final parades a few days later were a sad but proud time. As they parted for a last time the airborne maintainers wished themselves and all other airborne maintainers, "Fair winds and soft landings."}[22,23]

BEMEs and G4s

Formerly called the Brigade Electrical and Mechanical Engineer (BEME), the G4 Maintenance (G4 Maint) is the technical advisor to the brigade commander, his staff and all brigade units. One of his most challenging tasks is that of ombudsman between unit maintainers and service battalion sub-units. When deployed, he works as a duty officer in the brigade support cell command post. Finally, he is responsible for coordinating and staffing user trials on new equipments assigned to the brigade for evaluation, and assists the G4 on formation safety matters. With his vehicle and communications MWO technical advisors, he is kept busy with the many activities associated with equipment maintenance in the brigade.[24]

Mobile Repair Teams

One EME tenet is, "repair as far forward as possible." Completing repairs in situ despite the danger, dirt and difficulty shortens the downtime of failed equipment.[25] This tenet was a key to the success of the German blitzkrieg of 1939. It was adapted by the British Army and used successfully by REME in the Battle of El Alamein in 1942. Adherence to this tenet contributed to the success of 1 Canadian Corps in the Battle for Rome in May 1944.

Since World War Two there has been a continuing evolution of the idea of repair *in situ*. In the 1960s a forward repair platoon was established in 4 Field Workshop in Germany. All tanks, scout cars, command and control vehicles and ambulances were repaired *in situ* on a priority basis by the platoon. With the brigade spread out in several locations, this meant a lot of travelling for the repair teams. When units went on exercises repair teams were attached from the platoon. The repair teams' equipment was ad-hoc - and under continual redesign. Some used 2½-ton SMP trucks with 1-ton HIAB cranes. Others used standard 2½-ton trucks but relied on 5-ton wreckers for heavy lift. Sometimes the assemblies were carried on trailers sometime in the boxes of the trucks.

From these beginnings special purpose MRT vehicles or MRT SEV kits have been designed for LSVW, MLVW and HLVW chassis. In addition, the concept has been extended to the weapons and fire control systems technicians. In addition, the new trailer-mounted welding equipment gives the materials technician 'MRT-capability' for all types of welding and metal cutting tasks. More importantly this 'MRT-capability' is available in unit maintenance platoons as well as service battalion maintenance companies.

21. Bradley, Capt N.R.; *Unique Ubique 4 CER*; EME Tech Bulletin 2/85.
22.
23.
24. Wyville, Capt R.; *Life with the G4*; EME Tech Bulletin 2/85.
25. *The EME Tenets and EME Branch Mission Statement*; NDHQ report, 1994.

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The result is a capability to keep equipment fit for operations - anywhere, anytime, under any conditions. This is vital in to-day's environment where the success of operations depend on equipment. It is reflected in the Branch's image, the MRT master-corporal and his or her team doing a difficult, dirty job under dangerous conditions in the front line - and doing it well.

Summer Concentrations and RVs

In the 1960s the training year for a combat arms unit included individual training in the garrison in the fall and winter. Then there was a period of unit training in the spring. The year culminated when all units in the brigade concentrated at the area's training camp, Wainwright, Petawawa, Gagetown, Valcartier for the four to five-week summer concentration which included a formation exercise. The brigade in Europe had unit training in Sennelager in the late spring and formation training in Saltau in the fall after the crops had been harvested. A major event in a maintenance unit calenders is still the RVs. The difference is the scope. The summer concentrations involved only one brigade. The RVs involve more than one.

The preparation and planning starts months ahead. For units like 5 Service Battalion Maintenance Company, it involves a long rail move from eastern to western Canada, i.e. Wainwright. During RV92, for example, the company's advance party was on the ground three days before the main body. They laid out the bivouac area and set up tents. The main body arrived on April 19th and was operational the next day and ready for the first repair request.[26]

125 Maintenance Battalion The training varies from year to year. However, probably the most notable innovation occurred in RV89 when, for the first time in Canadian history, a Canadian maintenance battalion deployed as part of the Force Mobile Command (FMC) Divisional Support Group. It was called 125 Maintenance Battalion after the numbers of the three participating brigades. It was the largest gathering of land maintainers under one commanding officer in the post-war era.[27]

Second line maintenance support was provided by two company-sized brigade support units and the maintenance battalion. It had three functional maintenance companies and an administrative company. Maintenance battalion personnel had barely two months in which to separate from their usual co-workers, join those from other service battalions and learn to work side by side to form a cohesive unit. Each company grouped their personnel and resources in a different way in order to deal with this problem.

Perhaps the single-most coalescing factor for the battalion was its successful defence of the Catalo Bridge. During the field manoeuvre part of the RV, the maintenance battalion was defending the line of the Ribstone Creek in the area of the bridge. The airborne regiment put in an attack. However, unbeknownst to them, the maintainers had prepared an excellent defensive position and had extra weapons in reserve. The regiment had thought that the maintainers would be a pushover. Not so, they found out. When it came time to assess the battle, Lieutenant-Colonel G.A. Walsh strongly defended his unit's actions. The result was an imposed delay on the regiment and they had to go around the battalion. Maintenance morale was sky high![28]

Forward Operating Locations (FOLs)

The concept of FOLs was introduced in the early 1990s. The aim was to be able to operate jet fighters from austere airfields, e.g. Northern Canada. This had implications for EME ranging from maintenance of small arms, security containers to packages of tooling needed for towing tractors, bomb loaders etc.[29]

The idea was tested in the summer of 1995 during Exercise Bold Force. Ten jet fighters were operated from Camp Wainwright for a week under field conditions simulating an FOL. Captain M. Paul was responsible for the logistical support for the exercise including the tented camp for 300. During the same exercise, when the material used to resurface the aircraft parking area failed, it was Sergeant M. Ryan and Corporals D. Pettie, K. Armstrong ,and J. Tunn who stepped in to help organize the laying out of fibreglass matting to provide parking for the aircraft. They worked all night and had the matting in place in time to save the exercise.

The exercise helped to spot potential problems. For example, bomb loaders are items not often

26. Teuwen, Capt A.R.; *The Maint Coy of 5 Svc Bn is back in Wainwright*; EME Journal 1/94.
27. Walsh, LCol G.A.; *RV 89 125 Maintenance Battalion*; EME Tech Bulletin/RV89.
28. Walsh, LCol G.A.; taped interview with the author, 1992.
29. Wigg, Capt S.L.; *Support to Forward Operating Locations*; Annex K to the minutes of the Air Command EME Working Group 1991.

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moved to the field. One of them was damaged in off-loading after the move to Wainwright. It is a very difficult piece of equipment to service. However Corporal Tunn used a bit of ingenuity and managed to get it working so that it could be used for the exercise.

The exercise highlighted while showing many of the problems which the air force would have in operating from FOLs also showed the experience and versatility that most EME soldier-technicians take for granted.

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14

Chapter 14 - MAINTENANCE ON BASES

Transition from War to Peace, 202 Workshop Depot,
Army Bases, The North, On the Airfields, In the Dockyards,
Communication Command, Canadian Forces Europe

By the end of World War Two, the Corps of RCEME had faced and overcome many challenges. At the end of hostilities many fighting units were disbanded or returned to a reserve role. For the workshops and workers of the, Regular Force, however, the demands of war were soon replaced by the continuing challenges of peace.

First there was the transition from war to peace followed by the build up for the Cold War. Then a long period of deterrence in which budgets were gradually eroded and the demands of peacekeeping increased and intensified.

In 1989 the Berlin Wall came down and the Cold War abruptly ended, ushering in demands for further defence reductions in the face of recession and deficit and ever increasing demands for peacekeepers. During all this Canada's Craftsmen have been reorganized, renamed and reduced - they have kept equipment in service and trained as soldiers. Today their workshops are literally everywhere - on every base and most stations in Canada. Sometimes the workshops are large - sometimes only one or two Craftsmen.

Transition from War to Peace

Towards the end of 1945, with demobilization well underway, the Department of National Defence was faced with the problem of what to do with the vast numbers of vehicles, weapons and other military stores scattered across Canada and abroad. It was already obvious that our Russian ally was not as friendly as most Canadians had thought. The government, trying not to repeat the error of World War One of disposing of military hardware, initiated a massive program of collection, storage and maintenance of the army's equipment.

To assist RCOC with this storage task, there were already two third-line RCEME units in existence: 202 Base Workshop in Montréal, Québec, and 204 Base Workshop in London, Ontario. As more and more materiel came back to Canada, however, these facilities became overcrowded and the army had to find other locations for the overflow. Fortunately, the RCAF was in the process of closing out airfields used in the British Commonwealth Air Training Plan. Two of these were made available to the army and became 222 Workshop in McDonald, Manitoba, and 228 Workshop in Hagersville, Ontario.

The shortest-lived of these units was 222 Workshop, which operated as the technical arm of 2 Detachment Stock Vehicle Park, RCOC, from late 1946 to mid-1951. In spite of its short life, however, this unit evolved some important techniques for what was to be a continuing peacetime problem of military equipment storage. "As can readily be imagined," noted the last OC, Lieutenant F.J. McNaughton, "the chief enemy involved in this storage was weather - our long Canadian winters with their heavy snowfalls required operations which would ensure that the greater part of the work necessary for maintaining the equipments in storage was done in the summer time."[1]

With the runways full of parked vehicles, and the hangers sheltering guns and SP artillery of all types, ranging from 20-mm quad mounts to 75-mm howitzers, there was no lack of work to be done. To accomplish this, 222 Workshop instituted a two-part program that varied with the seasons.

The first part of the program involved sending crews of three or four men equipped with portable air compressors, mobile servicing trailers, and battery slave kits to work through vehicles on the runways. A well-trained team could generally handle thirty vehicles a day. In case of inclement weather, "Operation

1. RCEME Quarterly 4/1, page 29.

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Emery Wheel" was instituted. It was an indoor program which entailed the removal of engine components being adversely affected by the weather. The components were put aside for servicing and storage in the winter, while the vehicles were completely preserved, painted, and moved back out on the runways. When the snow began to fall, most outdoor work was completed, casual employees laid off, and the workshop turned to the equipment stored under cover. This, coupled with the work left over from "Emery Wheel," kept the shop busy for the winter months.[1]

By 1951 this system was functioning smoothly, but the Korean conflict and the re-equipping of some of Canada's new-found NATO partners meant that the equipment so carefully stored was once more needed for active service. So 222 Workshop passed into history 26 May 1951, just as 228 Workshop in Hagersville was preparing for its moment in the limelight.

As the older CMP vehicles were being shipped to various destinations around the world, planning was in progress for the new Standard Military Pattern (SMP) vehicles for the Canadian Army. Due to its location near the production facilities of GM, Ford, Willys, International and Chrysler, Hagersville was chosen as the base workshop to process this equipment on receipt from the manufacturer. Variations in design and material specifications caused a two-year delay in issuing the new SMPs, which meant that by 1954 there was a stock of some 40,000 vehicles in the park area. This presented an entirely new challenge in vehicle servicing to the RCEME Corps, complicated by the extreme humidity of the Hagersville area and by the uncertainty surrounding the issue of equipment. The problems were met and overcome in typical RCEME fashion. Many of the same SMP vehicles were still in service over thirty years later.[2]

Concurrent to the Hagersville program was a special program by contract in which old CMP vehicles used by the Canadians in Europe were reconditioned and given to NATO partners under the Mutual Aid Agreement. The reconditioning standard was 5,000 miles of major, trouble-free operation. Since this was a one-time operation and the Canadian workshops in NATO were fully committed with their operational roles, the work was done by contract. The contractor was made responsible for all work including the supply of spare parts and materials. A RCEME/RCOC team, called the Canadian Military Pattern Vehicle Contract Control Team and headed by Captain J.W. Moody, controlled the contract. After an initial survey and tendering process, Levy Auto Parts of Toronto was selected as the contractor with a Belgian firm as a sub-contractor.[3]

Each vehicle was inspected by RCEME technicians and the work to be done specified on a standard inspection form[4] using agreed, standardized terminology. Man-hours required were agreed between the plant engineer and Captain Moody and spare parts provided on an exchange basis. On completion of the work the vehicle was inspected by a RCEME inspector and when found satisfactory was released for issue.

One difficulties was the agreement on the labour required - Belgian estimates being considerably higher than Canadian. To overcome this, a series of meetings was held to agree on flat rates for each specified repair, and several demonstrations were done by the RCEME team members to show what were reasonable times. While this was going on, the remainder of the team's RCEME technicians carried out initial inspections on vehicles, so that there would be no delays once times were agreed.

During the six-month program 750 vehicles were processed in groups starting with ¾-ton Dodge Weapon Carriers, followed by 60-cwt trucks and finally miscellaneous types. Total cost was about $750,000 - 2% above the original budget. The most costly items were tires, which were found to be in much worse condition than expected. The team minimized replacements by reallotting tires to make up matched sets of tires in like condition.

"It was an interesting but tiring experience," recalls Captain Moody. "At times our work week was as long as 80 hours. Every effort was made to avoid delays and ensure top quality. The program showed the value of making the contractor fully responsible for all work and materials and delays. It was refreshing to see the extent to which the contractor went to ensure no delay due to spares supply, e.g. a rear spring air-lifted from San Bernadino, California to complete the Dodge ¾-ton part of the program. Back-order was a term that was not used!"[5]

2. RCEME Technical Bulletin 9/2, page 32.
3. By coincidence, the sub contractor's plant in the Antwerp suburb of Mortsel had been a site of 2 Advanced Base Workshop during World War Two!
4. At that time the CAF 2208.
5. Moody, Capt JW; unpublished article 1995.

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202 Workshop Depot

Workshop activities began as a part of the wartime Longue Pointe Ordnance Depot in the heart of Montréal's industrial district in 1942. Designated 202 Base Workshop RCEME on 1 October 1946, it became a self-accounting unit on 1 April 1948, and was redesignated 202 Workshop Depot (202WD) in 1966.

By 1969, the closing of 27 Canadian Forces Supply and Maintenance Depot in London, Ontario, combined with the closures earlier that year of the Naval Repair Facility at Ville LaSalle, Québec, and the Respirator Assembly Group in Cobourg, Ontario, left only one base workshop for the Canadian Forces - 202 Workshop Depot, Longue Pointe, Québec. The integration of the activities into "202," as it is often called, subtly altered the character of what began as a purely army facility.

In 1984, 202WD occupied four main buildings utilizing about 42,000 square metres covering an area of 16 acres in Longue Pointe Garrison. In addition, it maintained a field office and workshop at the Canadian Vickers shipyard in East Montréal. In 1985 a figure "8" banked test track was built to road test overhauled heavy tracked vehicles. The test track was demolished in October 1992, to make room for the construction of a new warehouse for 25 Canadian Forces Supply Depot. (A new track is planned. In the interim these road tests are being done at the Transport Canada test track at Blainville, Québec.) By 1995, 202WD occupied five buildings, utilizing approximately 33,300 square meters.

In 1984 its establishment was 600, comprising 150 military and 450 civilian personnel, was commanded by a LORE colonel and was organized into five divisions; administration, management services, engineering services, production and land maintainability engineering. The first two divisions performed the administration and control functions necessary in any type of workshop. The only difference with 202WD was the sheer size of the operation. For example, over 3000 work orders were scheduled annually by the management services division.[6,7]

At the beginning of 1994, the establishment of 529 - 139 military and 390 civilian personnel - was commanded by an EME colonel and was organized into seven divisions; vehicle & armament, mechanical, electrical & instrument, engineering services, quality assurance, workshop operation and administration divisions.[8] The last two were given the role of general coordination, management of operational tasks assigned to the unit, and personnel administration.

The engineering services division is the industrial engineering backbone of 202WD. Studies are carried out to develop and produce job standards for a wide variety of repair tasks. Then special tools, jigs and fixtures required for the job are designed. Engineering support is provided throughout the production phase and the completed work is carefully inspected by the personnel of the quality assurance division.

Of the many projects handled by the engineering services division, the one most closely linked with the workshop's past was the Lynx battle-damage repair carried out in 1978. This armoured vehicle was damaged while passing over a mine during the Turkish-Greek conflict in Cyprus and presented the staff with a type of problem that had not been seen in almost thirty years. A detailed survey was made of the extent of damage, followed by an estimate of the cost in labour and materials. It was decided to repair the vehicle, and the division followed through with complete repair specifications and standards. The Lynx subsequently passed the stringent quality control checks and returned to service, leaving behind a valuable addition to the already extensive collective knowledge of 202 Workshop.

A distinctly unusual project was the weather-shields for the 3-inch 50-calibre guns mounted on the Navy's River class destroyers. Due to the age of the ships none were available, so the engineering services division was tasked with determining how to build them. This led to a number of interesting problems as the shields were made of fibreglass, necessitating some rather intricate pattern and mould making to obtain the right shape and strength. What skills were not present were soon developed, and the workshop was able to deliver a shield to Halifax in time to replace one which HMCS Preserver had lost on exercise in the North Atlantic in 1978.

The major portion of the production division's annual 300,000 hours of direct labour is expended on army equipment. In place of the old Centurion rebuild line of the 1960s, there is a M113A1 APC rebuild line,

6. Sentinel 1978/1, page 8.
7. 202 WD Report 1978.
8. Rapport Historique Annuel 202 DA, 1993.

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a classic example of the application of new techniques to the old problem of keeping a fleet of tracked vehicles on the road. However, all sections are also involved with equipment that would have been very much out of place in the immediate post war years, e.g. the electrical group used to devote much time to ship refit items and Air Force radar equipment as well as the army's radio, optronic and electro-mechanical equipment.

A unique part of the production division is the respirator assembly and repair section. 9,000 masks assembled and almost 4,000 repaired in one year with a staff of ten is a record few can match. It's a one of a kind in Canada.

The Land Maintainability Engineering Division, while located at 202WD, was comprised of Information Services Group, Maintenance Techniques Group (MTG), and Repair Parts Scaling Group (RPSG). Among the many projects MTG tackled are two related projects which illustrate the strengths and weaknesses of our present maintenance system.

Project 7509 was a complete maintenance evaluation of the ANIMRD-501 Radio Direction Finding System, to consider the feasibility of transferring system maintenance from the manufacturer to the Canadian Forces. This required an examination of technical training, maintenance manuals, documentation and test equipment and, in addition, gave MTG a realistic picture of the CF's capability in this area. Paralleling this was project 8502 on the ANIMRD-502, the Automated Radio Direction Finding System. This was essentially the same equipment, but interfaced with a minicomputer to provide an automated system. The findings of these two projects influenced maintenance policy, but more importantly they revealed how little the LORE officers and men knew about microprocessors and minicomputers at that time. Thanks to the impetus provided by these MTG projects, action was taken to prepare the Branch for the impact of minicomputers on modern equipment. The Land Maintainability Engineering Division was transferred to the Land Engineering Test Establishment on 1 March 1987 and, upon the closure of LETE in 1994, to the Canadian Forces School of Electrical and Mechanical Engineering.

In this regard the first development was, suitably enough, within 202WD. Commenting on the new integrated system of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) in 202, Captain D.B. Parker noted in 1982 that, "With the aid of NUFORM and the NC machines, depot capability and capacity have greatly increased. There are faster turnaround times between jobs, better product reliability and minimum man-hours for tape preparation, as well as proofing on the machines. The system has proven very cost effective and is a truly welcome addition to 202 Workshop Depot."[9]

The Repair Parts Scaling Group was tasked with providing scales for the entire Canadian Forces. Its work backlog was such that about 18 months normally elapsed from the time a scale was demanded until one was produced. But when called upon, RPSG reacted swiftly to support Operation Angora, an urgent UN operation in Lebanon. RPSG was told late in the afternoon of 14 April 1978 to produce a list of 30-days usage of first and second line repair parts for 1¼-ton trucks, five types of radios, and an equal number of types of generator sets, ¾-ton trailers and a water tank trailer. Two-and-a-half days later, all work was completed. Once more, 202 Workshop Depot had solved the problem, living up to its unofficial motto "Gros ou petit, nous les réparons!"

Throughout the years, 202 Workshop has modified its structure to meet the challenges of an ever-widening scope of responsibilities. In effect it has become a centre of excellence in many fields. Taskings have ranged from watches to APCs and included such major projects as the rebuild of Canadian and German Army Leopard tanks. These have had an enormous impact on personnel, equipment and facilities in recent years. Today the culture at 202 is taking a more "business-like" - i.e. private sector - approach at all levels of the organization, from the technicians on the production lines to the senior management.[10]

In early 1989 the Quality Assurance Division, was established at 202. In 1990, a functional review carried out suggested that a matrix approach should be applied to the structural organization of 202. A project management group was transferred from the Production Division to the Workshop Operations Division. The planners were no longer responsible for specific work centres, instead they became responsible for a number of products from the time they arrived at 202 for repairs until they left. Also, a cost accounting section was added as part of the Operations Division. In 1994, this section was transferred to the

9. LORE Technical Bulletin 2/82.
10. Nault, Col J.A.N.; update notes on 202 Wksp Depot, 1995.

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Administration Division.

By 1995 the emphasis had shifted from the rebuilding of components to the repair and overhaul as well as product improvement of complete weapon systems, such as: the Leopard main battle tank, the M109 self-propelled howitzer, the M113 armoured personnel carrier - even the upgrade of Boffin anti-aircraft guns for the Navy. Working in close cooperation with civilian industry, 202 Workshop Depot excels in the integration of these complex systems and, as such, provides an essential and unique service to the Canadian Forces.

Under the supervision of the Electrical and Instrument Division, modern test equipment such as the Automated Test Equipment and the Leopard circuit tester have greatly improved fault diagnostics on such systems as the Canadian Artillery MiliPAC fire control computer. In the domain of optronics, equipment such as a laser alignment bench have contributed to making 202 the centre of expertise in North America for Leopard fire control technology.

The complete repair and overhaul of major weapons systems takes place at the Vehicle and Armament (V&A) Division. Since these major projects include stripping a complex system to the component level and painstakingly rebuilding the system to a like-new condition, V&A Division is now equipped with its own special armour welding facilities, plasma arc cutters, climate-controlled hydraulic test centre, new paint facilities, fixed and overhead cranes ranging from 5 to 40 tons, industrial washing facilities, a turret-depth fording tank and a railhead. Combined with the efforts of skilled military and civilian technicians, drawn from a variety of trades, these facilities allow V&A Division to exploit its capabilities to a high degree. To better track the progress of the work, the processes have been developed using industrial wire mesh baskets and a bar code system. This division can overhaul up to 25 Leopard tanks and over 50 APCs per year, while retaining the flexibility required to undertake several projects at once and maintaining the high quality of workmanship that is the trademark of 202 Workshop Depot.

United Nations Support Taskings. As Canadian Forces equipment is increasingly deployed around the world, UN taskings received at 202 Workshop Depot have increased proportionally. Distribution boxes used by communication units, muzzle covers for the 60-mm mortar, ammunition boxes, gun mounts and handles for the APC gun shield are some examples of products manufactured at 202 in support of UN operations. During Operation Cavalier and Operation Cordon, 202 was tasked to paint several vehicles for deployment to these missions. 202 also provided two riggers to 25 CFSD to load several containers. Cooperation between 202 and 3 Canadian Support Group was developed to facilitate the repair of various equipments returning from UN operations. During the summer of 1994, the first battle-damaged M113 APC was returned from the UN mission in former Yugoslavia to 202 for rebuild. So far, seven M113 APCs have been received at 202 for similar type of repairs. These battle-damaged vehicles are processed through the normal M113 depot level inspection and repair programs.[11]

Refurbishment of the Diamond-T "M"Lorry. As part of the 50th Anniversary of the formation of the Corps of Royal Canadian Electrical and Mechanical Engineers, 202 Workshop Depot accepted the mandate to assist the Canadian War Museum with the restoration of a unique vehicle, the Diamond-T "M" Lorry. This World War Two automotive machine shop truck is highly-representative of the history of the EME Branch. The project started in January 1993 with a completion date of May 1994. Employees at 202 demonstrated splendid craftsmanship in the accomplishment of the restoration of the vehicle, respecting as much as possible the original standards. The requirement called for nearly 2,000 hours of production time to complete the entire vehicle, including the overhaul of all the tools and machinery inside the shop pod. The search for some parts extended all across Canada. It was presented to the Canadian War Museum during the EME 50th Anniversary parade and sports day at 202.

The Future. 202 Workshop Depot has met its reduction objectives by rationalizing its product lines and returning to the private sector those products that could best be done by the private sector. The strength of 202 lies in its capability to overhaul complete weapon systems of a complex nature, and often in quantities too small to be cost-efficient by private sector companies. 202 will continue to strive to deliver products of the highest quality at the lowest cost possible to maintain its status of being first among its equals, as stated in its motto "Primus Inter Pares."

11. Sardana, Captain N.; *RCEME-LORE-LEME-EME: Fifty Years of Service*; Lookout, CFB Esquimault, 1994.

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Army Bases

RCEME Companies and Static Workshops. To meet the requirement of supporting a wide variety of Army units across the country, the newly-formed Corps of RCEME at first followed the earlier traditions of the pre-war RCOC (see Appendix 1). The first RCEME companies were numbered after the old RCOC detachments, which in turn were based on Military Districts designated in 1907. However, a distinctive RCEME flavour was soon added, with the designation of "Workshop, RCEME" given to those companies with a company HQ. In numbering the workshops, an attempt was made to proceed in a fairly logical fashion from the East Coast to the West.

The workload of a static workshop varied greatly according to geographical location and changes in repair policy. A number of these units were known as minor base workshops in the 1950s and early 1960s. The rationale for having a fourth-line overhaul capability in a relatively small static workshop, as noted in a 1954 consultant's report,[12] had economic and strategic advantages for the army. At a time when 4,000 engines were being overhauled annually, the cost of shipping engines to the base workshops located only in London, Montréal, and Borden was much higher than decentralizing some of this work to Vancouver, Regina and Halifax. This regional approach provided facilities that could support large scale concentrations anywhere in Canada and, in addition, was excellent training for both officers and technicians. For example, the expanded facilities in Regina allowed specialized overhaul lines for the overhaul of Penguin over-snow vehicles and No. 29 radio sets in support of northern exercises and operations.

These minor base workshops operated until 1963 when the workshop in Regina was closed out and the other two were reconverted to normal static workshops .

One of the earliest stories of how life was far from static in static workshops concerned an unusual task of "horse recovery" at 200 Workshop RCEME in Halifax in 1950.[13] It seems that, "Two slide rules, 22 yards of marquee-side tarpaulin, 1,500 pounds of ailing horseflesh, 6 feet of hoarse profanity and a full squadron of well-scratched RCEME heads were mixed together in Halifax the other day to provide 200 Base Workshop with a recovery job from which it will take a long time to recover. Plodding Josephine had suddenly collapsed at the intersection of Quinpool Road and Robie Street, while pulling the early milk run. The local veterinarian "exuding the tantalizing aroma of the stables" arrived on the scene and declared that if Jo was to survive she must be removed to her stable at once. After the fire department, garages and "One Long Wong's Laundry Delivery Service" had refused to remove her, RCEME was called upon to make recovery."

A few years later, there was much action at 213 Workshop. In the face of the worst flooding of the Red River in many years - rising 30-feet above normal - RCEME came to the fore, playing operational as well as the usual support roles. Long before a national emergency was declared on 5 May 1950, Corporal W.S. Stewart and Craftsman F. Sutton of the workshop were evacuating the towns of Emerson and Morris (south of Winnipeg) using an amphibious Weasel. They were later reinforced by three more members of the workshop who brought an amphibious 2½-ton vehicle, a DUK(W), from Winnipeg. The newspapers praised them highly for their selfless work over a 10-day period. In addition, under RCMP direction the RCEME crews carried out sand-bagging and evacuation operations in Morris.[14]

At 1000 hours on 6 May 1950 Operation Redramp began and a flood control HQ, including the Command EME, Lieutenant-Colonel C.M.R. Elmsley, was set up in the provincial legislature.[14] At 213 Workshop, 12-hour rescue shifts were run around the clock. For example, on 10 and 11 May, 300 people were evacuated from St. Jean to Morden by the DUK(W) - which had returned from Morris - and two Games and Fisheries boats. From this operation until the early 1960's these vehicles were given a special inspection and serviceability check in the late winter just in case. They were used again in 1957.

RCEME was also occasionally involved with the RCN. In 1966 a group of Navy veterans purchased a retired RCN frigate, the Inch Arran, with the intention of docking it in Kingston and turning it into a youth centre and ex-mariner's club. However, they ran into anchorage problems and the engineless rusting hulk came to rest at HMCS Cataraqui's jetty. It was not a welcome sight and, after three weeks of meetings and discussions, the OC of Kingston Base Maintenance Section, Major A.J. Jeffery was tasked to move the frigate

12. Bayne, A.S. and Company; *Report on Engine Rebuild Study in RCEME Workshops*; NDHQ Report, 1954.
13. RCEME Quarterly 2/4, page 2.
14. RCEME Quarterly 2/3, page 18.

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back to its original location in Kingston harbour. However, a boarding party had sawed through the main anchor cable the night before. Nevertheless, a combined team of naval divers and the maintenance section's recovery crew got the job done. The anchor was recovered, RCEME welded the chain together and the frigate was towed into position. It was unofficially rumoured that welding of the anchor chain was following by splicing the main brace![15]

As ammunition technical officers (ATOs), EME officers - in addition to often being EOD (explosive ordnance disposal) qualified and tasked as a secondary duty - have also served in both second and third-line ammunition facilities. In the former case this included appointment as Brigade ATO in a combat group in which responsibilities were both technically and supply oriented. In the latter case appointments have usually been as technical officers. However, in 1983, Major J.M.P. Berube became the first LORE Officer to be appointed commanding officer of an ammunition depot - in this case, CFAD Angus.[16]

Even the more routine jobs are not always easy. In the province of New Brunswick, the recovery section of base maintenance company, CFB Gagetown is almost a unique resource. Equipped with the M578 and ARVL tracked recovery vehicles, as well as the Foremost heavy-duty wrecker, they are often called upon to perform difficult tasks. For example, in bad weather in the winter of 1979, a large semitrailer filled with gasoline overturned at Minto, N.B. The RCMP turned to Gagetown for assistance and, after some careful work, the semitrailer was back on the road. This job was soon followed by the recovery of two Militia 2½-ton trucks that had skidded off a bridge and fallen thirty feet into a stream - all in a day's work for the maintenance company's technicians!

Many of today's base maintenance sections are accommodated in "100-man RCEME workshop" buildings. These buildings, noted Lieutenant H.F. Protheroe in 1950, were specially designed for the static RCEME workshop organizations of the time because, "all of our workshops today [then] are located in buildings that are not designed for workshop activities; they are simply the best that could be found at the time."[12,13]

This comment was repeated almost thirty years later when, after some years of neglect, the original DME design staff's model of the 100-man workshop was being repaired for the Base Borden museum in the summer of 1978 by a group of phase III officer cadets, under the direction of Captain L. Eif, acting OC of LORE Company. As the model started to take shape again, one officer cadet wondered aloud about the awkwardness of the layout, suggesting it would be so much easier to build a better workshop today. A comparison of the model and the standard 1950 workshop organization quickly revealed, to the young officer's surprise, that the building was nearly as perfect as could be expected! What had happened in the intervening years, of course, was that the EME organizations had continued to grow and change, while the buildings remained unchanged. For example, in Petawawa and Calgary the 100-man workshop buildings now house part of a service battalion maintenance company (Svc Bn Maint Coy). This type of unit, unheard of in Lieutenant Protheroe's time, is a descendant of the field workshops formed in the late 1950s.

Formed from the now-disbanded 3 Service Battalion, Base Maintenance Company CFB Gagetown is the largest land maintenance organization in the Canadian Forces with an average strength of 330 personnel spread over 14 buildings. A training base where virtually all types of land technical equipment are found, personnel of the BMC frequently provide first-line support to the three combat arms schools seven days a week, twenty-four hours a day.

Individually, a craftsman in a field workshop came to the fore when he - or she - was providing services to detached elements. This often involved lengthy periods away from the normal working environment, usually in cramped, unsuitable quarters with a minimum of resources on which to call. It's not surprising, then, that among the craftsman's many assets is a well-deserved reputation for quick-thinking versatility and ingenuity.

There are many examples of where this quick-wittedness was applied to the community at large. One such example is recalled by Corporal E.J. Foster, who recounts the day when he and Corporal R. Bertrand were returning to CFB Borden at 0300 hours. As they stopped at the intersection in Cookstown, they noticed flames and smoke shooting out of a local flower shop. Noticing the apartments above the store, Cpl Bertrand ran to alert the occupants while Cpl Foster dashed across the street to call the fire department. Both

15. RCEME Technical Bulletin 12/2, page 34.
16. Porritt, Maj R.I.; unpublished notes, 1983.

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corporals then tried to put out the fire using only hand extinguishers. Five people in the apartment building next door were roused by the two men as the fire department arrived, but the building itself was lost. Foster and Bertrand were later credited with saving 8 lives and were awarded Chief of the Defence Staff Commendations.[17]

In another unique example of community effort, on June 2, 1992, four personnel from Base Maintenance in Borden rescued a pregnant cow that had collapsed in a swampy area near Beeton, Ontario, due to injured hind legs. An APC Fitter was used successfully in the rescue and the four rescuers were given the honour of naming the cow "Bluebell". Cow and calf are doing well![18]

{Craftsmen often work beyond the call of usual work duties. During the Cougar AVGP retrofit and overhaul project in 1995 at the maintenance section of the Militia Training Support Centre in Meaford, Corporal G.R. Young analysed the tasks of each of the six trades involved. On his own time and initiative, he wrote a complete chronological step-by-step set of instructions encompassing the dismantling and reassembly procedures from start to finish for all trades. These installation instructions helped to speed up the project, and were disseminated to other units involved in similar projects. The 14 Cougars that were modified using these instructions were designated for contingency operations Cobra and Venom Strike. Corporal Young was awarded a Chief of the Defence Staff Commendation.[19]}[19]

The North

The Eastern Arctic. Soon after World War Two, the Canadian Army became quite active in the North, following up on work started during the war (see page 82). This led to some interesting assignments, including one given to Warrant Officer (Class 2) T. Burton, Sergeant J. Hanash and Craftsmen Quigley and Pike, all from 213 Workshop RCEME. In September 1947 they were tasked with assembling two D6 caterpillar tractors at Baker Lake in the Northwest Territories. Due to the load limitations and handling facilities at Baker Lake, the tractors had been disassembled at Churchill and flown up in pieces. Borrowing a locally-manufactured crane from Capt Tickling, OC 223 Workshop, Churchill, Warrant Officer Burton and his men became highly-skilled at unloading Dakotas and handling awkward loads under primitive conditions. They worked through October at Baker Lake with few problems, manhandling over 28 tons of equipment into position and assembling this equipment in roughly 500 man-hours. Ironically, the aircraft that had arrived so regularly to bring in components, were then not seen for three weeks due to weather, leaving four bemused vehicle mechanics to enjoy the "pleasures" of Baker Lake in November![20]

Supporting Tests and Exercises in the North. The ability to operate equipment in the North has long been part of Canadian strategic planning. Trials to test that capability were conducted during World War Two and continued afterwards. RCEME tradesmen were kept busy supporting them and testing equipment. Organized as Advanced Workshop Detachments (AWD) they travelled far and wide. To support a combined US Army Engineers/RCE airfield construction exercise in the Yukon in the early 1950s called Exercise Eager Beaver, a nine-man AWD headed by Warrant Officer (Class 2) J.D. Snell was despatched from 23 Composite Brigade Workshop in Petawawa in November 1951. They found that their maintenance facility for the next six months was nothing but an uninsulated barn with a gravel floor, heated by a half-dozen wood-burning "Yukon heaters" made from 45-gallon drums. Living quarters were tar paper shacks supposedly warmed by space heaters, although snow collected quite often along the walls inside the huts. However, the AWD was kept very busy working in three shifts 24 hours a day - from January to the end of March - with only three days leave per month to Whitehorse.

As the AWD soon discovered, repair and recovery at 40-below calls for equal parts of ingenuity and endurance. By end February, the last transmission for Penguin over-snow vehicles had been used, and users were cautioned that the transmissions were "hunting" when kept in high range over difficult terrain. As luck would have it, a Penguin became stranded in the middle of Lake Kluane, which was crisscrossed with heaved ice and crevices. W02 Snell and Corporal K. Corrigan set out for the casualty with another Penguin at 1600 hours and by 2000 hrs had the drive shaft disconnected, cables hooked up and were ready to head back. Although they were only eight miles from camp, the danger of throwing a track in one of the numerous

17. Foster, Cpl E.J.; taped interview with the author, 1995.
18. Hebert, Capt D.J.J.; *A Moooving Tale*; EME Journal Fall/93.
19. Citation for CDS Commendation for Cpl G.R. Young, 1995.
20. RCEME Technical Bulletin 7/4, page 46.

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crevices coupled with the high range problem kept them literally at a crawl. As well, the casualty had to be steered, which meant that someone had to stay in the unheated cabin of the towed vehicle. By the time camp was reached at about 0300 hours, even the dubious warmth of the huts was very welcome.[21]

Twenty years later, in May 1972, 1 RCR was sent to Fort Churchill, Manitoba on Exercise Northern Ramble. The purpose of this exercise included determination of the cross-country capability of the M113A1 APC in the North during the critical spring breakup period. To provide second-line maintenance support for this exercise, a 15-man detachment from the mobile repair platoon of the maintenance company of 2 Service Battalion was sent to augment the 1RCR maintenance platoon. The augmented maintenance platoon was well set up in an old military building of the standard Air Force MSE garage style. However, the majority of work on the APCs was performed where they broke down, which they did with great regularity.

Temperatures ranged between 0°F to 50°F over the period of the exercise, with the ground alternately freezing and thawing. The terrain was spotted with "potholes" up to and including the size of an M113A1, and steep enough to scrape the hulls of the APCs. Shock arms, shock absorbers and drive sprockets were badly bent or broken by the harsh treatment they took, and one final drive was shattered to pieces against a rock.

The repair of this final drive proved to be the most difficult job of the exercise. The vehicle was inaccessible to any of the HIAB crane trucks, and it would have caused further damage to tow it as it was. Although the final drive weighed over 80 pounds and was usually lifted by slings, Master Corporal A.J. Cathcart and Private Murphy struggled knee-deep in slush to manhandle it into place. This act earned them and the maintenance platoon a warm commendation from the CO, who also remarked that the entire exercise seemed to have been designed to tax maintenance resources to the limit.[22]

The NorthWest Highway System.[5,23] When war was declared by the U.S.A. against Japan in December 1941, there was immediate concern about the vulnerability of Alaska and the lack of good transportation between it and the rest of the U.S. Negotiations with the Canadian government quickly resulted in an agreement on three major projects: construction of a pipeline from the oilfields at Norman Wells to a refinery to be built at Whitehorse (the Canol project), a series of airfields to provide an air staging route, and a highway to service these facilities and link existing road systems in Canada and Alaska. The highway ran from Dawson Creek, B.C. (Mile 0) to the Alaska/Yukon border (Mile 1,221.6) and then on to Fairbanks.

Construction began in 1942 under the control of the US Army Corps of Engineers, using both military and civilian labour. The route followed the "tote" road which had been used by survey and provisioning parties. This led to some peculiar features such as the bends where a bulldozer driver had made a diversion around muskeg, rock, etc. Much of the work in future years was spent in smoothing out these diversions.

When the war ended, Canada assumed control and maintenance of the 1,221.6 miles of the road within its borders. This task was allocated to the Department of National Defence. In 1948 the North-west Highway System (NWHS) was established, responsible for the Alaska Highway itself and tributary roads such as the Hafnes cutoff and Atlin road. Its headquarters was in Whitehorse and it had two RCE units, Highway Maintenance Establishment and #1 Road Maintenance Company, as well as several support units including a RCEME Company.

16 Company RCEME had its headquarters at Whitehorse. It had an inspection team (which often acted as a mobile repair unit) and two workshops, 219 Workshop RCEME at Whitehorse and 220 Workshop RCEME at Fort Nelson. 220 Workshop was responsible for repair and recovery from Dawson Creek, where it had an AWD, to the Lower Liard River (Mile 497). 219 Workshop was responsible for repair and recovery from there to the Alaskan border and had AWDs at Watson Lake and Destruction Bay. Each workshop had approximately 80 people - half RCEME and half civilian.

219 Workshop was housed in the former machine shop building of the former Canol Refinery. The vehicle paint shop was housed in a separate building. Because the buildings were of wooden construction, fire safety was of prime importance. 220 Workshop was located in a building constructed in 1952. However,

21. Snell, Capt J.D.; unpublished notes, 1983.
22. Northern Ramble 1972 Report.
23. Royds, Major WE; *RCEME on the NorthWest Highway System*; unpublished article, 1994.

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due to faulty construction, it was soon found that the roof was in danger of collapse. The many props used to prevent this collapse were dubbed "Musqua National Forest" (after the nearby Musqua River).

The remote location meant there was a long lead time for spare parts. Consequently both workshops became involved to some extent in third-line repairs - 219 Workshop more than the other because it had battery, radiator and tire shops as well as a more completely-equipped machine shop. As a general rule, if an item could be repaired even to the extent of manufacturing parts, it was. The battery shop was an outstanding example as batteries were completely disassembled, any usable parts recovered, cleaned up and reused - including melting lead components and casting new ones. Each rebuilt battery was serially-numbered, and was found that these rebuilds were outlasting new factory-built ones by a factor of at least 3-to-1! Although 219 had the only wheel alignment equipment north of Fort St-John - over 800 miles on down the highway! - neither workshop had electronic, instrument or armament shops, so some radar equipment and antiaircraft guns stored in the area against possible future war were serviced periodically by artificers from Vancouver.

Recovery was a major task as there was a standing intergovernmental agreement that the highway must be kept clear. Damaged or inoperative equipment that could not be quickly repaired or recovered was pushed or hauled off the road for later action. Diamond-T wreckers with heavy pusher fronts were the standard recovery equipment. During one job, the Watson Lake wrecker with a loaded 6-ton truck on suspended tow was proceeding up a hill when the driver missed a downshift. As the wrecker and tow started to back down the hill, the driver switched off the ignition and tried to leave the wrecker. He was caught by the pusher guard, dragged down the hill and his leg was badly injured. The tow turned over and was a complete write-off, while the wrecker remained on its wheels and required only minor repairs to its booms! A ½-mile track had to be made to recover it.

Spring floods were a perennial problem when small streams became raging torrents. One time there were over 20 washouts in 30 miles of road, and the NCO in charge at Destruction Bay was trapped in the middle of them for several days. During the construction of the Donjek River bridge, everything was quiet and peaceful at midnight one night and by morning the site was under water, the work bridge was washed away, and much equipment was buried. 219 Workshop personnel worked steadily for two weeks on that clean-up. While some equipment had to be located by mine detectors, an 80-horsepower steamer was found when its stack was spotted sticking almost imperceptibly out of the mud. The extent of the clean-up required was massive. As an example, when the top of a large voltage regulator was removed, it revealed a solid block of silt with the imprint of the name "Lucas" beautifully reproduced from the cover.

Constructing the Donjek bridge was the top-priority project of the early 1950s. The largest crane on the NWHS was considered to be absolutely essential to getting the job done. "One afternoon," recalls Captain J.W. Moody, "the crane's 90-foot boom dumped over the bridge and was bent, twisted and doubled back on itself, requiring a complete rebuild. 219 Workshop had to admit defeat, as without the material or manpower it was impossible to rebuild the boom in the time the users specified. Sometimes it is good to turn down a request because alternative equipment was found. What was more ironic was that when the bridge was completed, the Whitehorse Star gave the credit to RCEME not RCE. The staff of 16 Company RCEME were sure that the Star was correct!"

The NWHS was a kind of testing ground for all kinds of new vehicles, fighting equipment, clothing, and material (such as oils and grease) for use in cold areas. RCEME assisted in much of this work and also hosted many military visitors from the Vehicle Proving Grounds near Ottawa and other Canadian Military test facilities. Some Northern exercises, such as Musk Ox and Eager Beaver, were also supported.

"As we were about a thousand miles from railhead and air service was spasmodic, we were forced to seek our own amusements," recalls Lieutenant W.E. Royds. "The US Army had turned over to Canada their Armed Forces Radio station in Whitehorse. This had a low-wattage transmitter but it included a wonderful library of 16-inch vinyl records. I was appointed the station supervising officer. There was no military funding for the station so by various raffles and Radio Weeks we were able to raise enough money to purchase time on the telephone system to bring in sports events such as the Grey Cup and the Stanley Cup play-off games. Eventually we had thirty volunteers operating our station, and broadcast programs for 16 hours per day to the local populace. Our station was called CFWH[24] and operated at 1240 kilocycles. For a

24. CFWH was eventually taken over by the CBC and is still operating in the North.

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number of years we were the only radio available to the citizens of Whitehorse.

Other entertainment included sporting activities such as basketball and baseball, which were fun but which did not have nearly the impact on our population that our hockey league did. The town league had four teams: Army, Air Force, Town, and Legion. The quality of play was very high and the friendly rivalry between the teams and their supporters seemed to considerably warm up and shorten our long winters. We obtained a small portable transmitter. Our Company Artificer Sergeant-Major, Warrant Officer (Class 1) R. Thorn, an NCO from the RCAF and myself broadcast the games three times a week and conducted a "Hot Stove League." We would give colour commentary during the game and then try to select the three stars of the game. Woe betide us if we picked the wrong stars. No actual bodily harm befell us, but we often had to defend our choices at work or in the messes!"

In 1964 the Department of National Defence turned over its responsibilities for the Alaskan Highway to civilian control. The Northwest Highway System was disbanded and its military personnel posted. To many the NWHS was a wonderful training ground, as the work was not some training exercise but fulfilling genuine needs and created by circumstances which were often not pre-planned.

Northern Region. Comprising the Northwest Territories, the Yukon and Canadian Arctic Waters, Northern Region supports military activities in the area and is responsible for the Canadian Rangers and Cadets, which are major community activities in the region. Northern Region Headquarters is in Yellowknife and has a small one-person (an EME Vehicle Technician) well-equipped workshop. Occasionally EME officers are posted to the Region staff. Brigadier-General V. Pergat was Commander from 1991 to 1993.

On the Airfields

EME technicians can also trace their roots to the RCAF (see page 294). Known as mobile support equipment technicians (MSE Techs) or "ME-techs," they were called upon to look after an amazingly diverse fleet of special-purpose vehicles, including runway sweepers, aircraft refuellers, heavy mobile cranes, and auxiliary power units used to support the flying operations of the air force. To master this equipment required a wide range of skills. Whereas their army counterparts had a number of trades to handle the requirements of their larger fleets of vehicles, the ME-tech was often the only mechanic around in isolated RCAF stations. Therefore, in addition to their normal role as auto mechanics, ME-techs acted as machinists when they manufactured replacement parts on a lathe, electricians when rewiring switch panels on electric forklifts, hydraulic system technicians when they renovated and repaired bulldozers and snowblowers, and as acetylene and electric welders when the occasion arose. In short, the ME-tech had to be a jack-of-all-trades.[25]

With Unification, these technicians became part of the vehicle technician 411 trade, the AAGSE speciality. Consequently, it was not unusual - in the days before the LORE badge was approved - to see a mobile repair team all wearing air force hat badges at work on a Centurion tank. Of course, the problems of the high-cost/low-density equipment peculiar to airfields did not disappear. In fact they worsened in the late seventies and early eighties, as the air force had bought a large percentage of its vehicles in the 1966-1969 time frame and the bill for replacement of the aging fleets (over $55 million) strained the budgets of the late 1970s. In addition, there was a growing reliability and parts obsolescence problem.

Local EME ingenuity helped. For example, Base Maintenance (Land) CFB Trenton was tasked in January 1980 to re-life a 1969 Model 212 SMI sweeper. This major project involved re-powering from the obsolete 534 Ford gasoline engine to a Caterpillar 3208 diesel engine, re-lifing the hydraulic system, modifying the frame and wiring system to adapt to the new power pack, and a number of other modifications needed to improve accessibility and maintainability. A year later, project director Sergeant A.A. Gordon noted, "After modification and the ensuing growing pains, it rapidly became evident that the re-lifed sweeper was a winner. It has been successfully operating at CFB Trenton since August 1980 - over 300 hours with only minor VOR time."[26]

EME ingenuity helps in emergencies too. For example, early on 23 June 1994 just hours before the start of the 1994 Quinte International Airshow, the refuelling section at 8 Wing EME Squadron (CFB Trenton) received a phone call stating that the refueller carrying gas-diesel had a broken drive shaft and was leaking fuel at 9 Hanger. This was the only truck on base carrying gas-diesel, which is needed for the aircraft

25. Roundel Dec 63, page 14.
26. LORE Technical Bulletin 2/81, page 32.

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to produce smoke. "The information was quickly passed to my supervisor, Corporal J. Trelinski," recalls Mr G. Ridgley, one of the squadron's civilian vehicle mechanics. "We went to the hanger to see what we could do. When we arrived we discovered that the power take-off drive shaft was split in half and the 'fuel leak' was the transmission line. We plugged the line, removed the shaft and moved the vehicle to our workshop for repairs. We found a piece of 1½-inch steam pipe that we could use as a new drive shaft. Cutting the yoke off the old shaft, our welder, Mr R. Terry, welded it onto the new shaft and fitted the spline. Meanwhile our parts-chaser, Corporal P. MacDonald, went to town and got a pair of U-joints. We assembled the new drive shaft, installed it and tested the vehicle. All was well. By 1600 hours the truck was back on the road and the shaft worked well all thru the air show weekend with no problems whatsoever. It was a bit of an ad-hoc repair - but the show went on![27]

Unification posed problems which have taken many years to resolve. Prior to Unification in 1968, MSE technicians were organized as sections in Base Transport. Unification brought expanded maintenance responsibilities to all bases, with each base becoming responsible for Militia and Cadet equipment in its area. Maintenance sections were greatly enlarged and included all EME trades. By the mid-1980s Base Maintenance (Land) sections were reporting to the Base Technical Services Officers.

There was the possibility of confusion if the word Maintenance in organization titles was used for both aircraft and land equipment maintenance. Accordingly, the aircraft maintenance organization became the Base Maintenance Squadron while the land equipment maintenance organization became the EME Squadron or Flight. EME officers on air bases were really EMEOs!

Unification also brought a great infusion of EME badges and brown uniforms to air bases. This had the potential for a lot of heart ache. However, hard work with no fuss and no muss, focusing on the priority - the flight line - and the ability to quietly fit in have allowed Canada's Craftsmen to earn their place on the airfield and in Air Command Headquarters. When the Queen came to Comox in 1994, Corporal J. Osterhom was one of two who stood guard at the reviewing stand. When she went to Yellowknife, Master Warrant Officer D. Burritt ran the base camp for the ceremonies.

{During Exercise Bold Force, ten jet fighters were operated from Camp Wainwright for a week under conditions simulating advanced operation locations and a tented camp for three hundred was set up to support the operation. Captain M. Paul was responsible for the logistical support for the camp. During the same exercise, when the material used to resurface the aircraft parking area failed, it was Sergeant M. Ryan and Corporals D. Pettie, K. Armstrong and J. Tunn who stepped in to help organize the laying out of fibreglass matting and worked all night to save the exercise.}

When Air Command Headquarters conducted a study on the delivery of food services in the Command, Lieutenant-Colonel K.W. Kirkland was appointed a member of the study team. When the EME Squadrons on many bases conducted badge-changing ceremonies in 1991 the inspecting officer was often the base commander.

Outstanding work by Craftsmen in the airfields does not go unnoticed. In 1993, Major R.L.R. Johnson, Wing EME Officer for 8 Wing in Trenton, was awarded the "Commander's Commendation" for hosting the first-ever CF Safety and Health Awareness Day at CFB Trenton.[28]

Air Command EME Working Group. The Air Command EME Working Group has met annually since its inception in 1979, when Major G. Stephansson was SSO Land Maintenance Air Command. Chief Warrant Officer G. Wells and Captain B. McLean were on the staff. Attendance at the working group - then called the Air Command Land Maintenance Conference - originally included workshop officers and ETs from major bases and NCOs IC maintenance from the smaller units, e.g. radar stations and helicopter squadrons.

This first conference was very much a working session. It was held at a time when very old obsolete airfield ground support equipment had to be kept in service at the same time as major replacement projects were coming on line. It was a time of difficulty in keeping old refuellers and runway sweepers and aircraft towers serviceable while at the same time getting information out to the flight lines on new equipment that was soon to be coming into service. Naturally enough then, a major portion of the conference was allotted to technical briefings and question-and-answer sessions by LCMMs with base/station maintainers.

27. Ridgley, Mr Gerry; *The Horse comes thru for the '94 Quinte International Airshow*; unpublished article, 1994.
28. *Major Johnson Receives Air Command Award*; EME Journal, Fall 93.

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Major Stephansson phoned Colonel M.C. Johnston, DSVEM, and asked for his help. When Colonel Johnston arrived he brought the entire DSVEM 3-4 team with him. They took up half to ¾ of the agenda and gave extremely detailed briefings on how to keep old equipment going and what to do with new equipment. "One of the unique features of the conference was the informal exchange of information and how to solve participants' problems," notes Mr. E. Ewing, a participant in all the conferences. Success in attaining this aim was the reason the conference continued with very much the same format. Over the years, there was an increasing emphasis on improving workshop efficiency as well as maintaining currency on equipment. In addition, Air Command, CF and EME branch briefings gave it a well-rounded agenda.[29]

Within Air Command, the EME workshop of CFB Bagotville is typical of many, although unique in that its working language is French. CFB Bagotville is also the only unilingual French base within the Command. Since 1990 the EME workshop has operated as an entity separate from Base Transport, with an EME officer (captain) who answers directly to the Base Technical Services Officer. The medium-sized workshop is composed of 34 personnel spread out in four different locations, and its main responsibility is to maintain the operational fitness of the land technical equipment of the base with special operational priority given to airfield ground support equipment such as runway sweepers and ploughs. Support services are also provided to local units such as Le Régiment du Saguenay (Militia), the Chicoutimi and Sept-îles Naval Reserves and all the Cadets Corps in the area.[30]

CFB Shearwater also has a medium-sized EME workshop of 21 military and 20 civilian personnel. Headed by an EME captain, the workshop is divided into three sub-sections: the control office, vehicle production and ancillary. The control office is typical of a small unit in that there are more tasks in the EME bible than there are personnel to perform the tasks! The ETSM and Control/Safety Training Officer administers the one-person workshop support cell. The 17-person vehicle production section is spread out among four buildings. Virtually all first and second line functions are completed within the four sub-section locations. Heavy equipment and refueller sections perform second-line repairs in their own locations.

A unique feature of the 18-person ancillary section is its mix of civilian, EME and naval tradesmen. The section is in charge of a chief petty officer, second class, marine engineering artificer and has a dozen stokers and hull technicians. Posting to EME Workshop Shearweater gives them a welcome shore posting in trades which are often at sea for long periods of time. They bring to the section a "new perspective of unchallengeable inventiveness - often required in mid-ocean!"[31]

Craftsmen on the airfields often distinguish themselves through their determination to succeed and to serve. BFC Montréal's maintenance section undertook its biggest recovery mission during the Montréal International Air Show in June of 1993. A Starlifter, the transporter for the technical support team of the US Air Force F16 'Thunderbirds,' had fallen through the asphalt of the runway, with the wheels of the landing gear under the wings sinking 18" deep and its belly almost touching the ground. The recovery team of the US Air force laboured in vain until the base maintenance officer, Major J.C.D. Turmel, identified himself and the availability of two wreckers. Adding to the cables already set by the American team leader, spades were lowered, supporting plates were installed and cables to winches on both wreckers were hooked to give a total pulling force of 120 tons. The recovery was arduous but successful - thanks to USAF/EME cooperation![32]

Whenever Craftsmen focus their skills on a single - and often unusual - project, they demonstrate remarkable teamwork and motivation. In the fall of 1989, the BEME technicians of CFB Trenton challenged themselves with the restoration of a M38A1 Willys Jeep that was essentially an assembly of corroded metal and tangled wires. Major D. Marcus had decided that such a project would be a morale booster and a source of inspiration for younger soldiers. Vehicle technicians, material technicians, fire control systems technicians and a host of other military and civilians all pooled their skills to refurbish a piece of history that finally took up its post on the parade square at CFSEME, CFB Borden in May 1991.[33]

Sharpening-up soldiering skills, even just for the sake of a good competition, can be rewarding. CFB Ottawa entered a team into the Canadian Forces Small Arms Competition (CFSAC) for the first time in 1990. Nine of the eleven team members were from the EME Workshop and, although their primary intent

29. *The Air Command EME Working Group*, historical notes, 1995.
30. Egglefield, Capt Y.; *EME Workshop CFB Bagotville*; EME Journal 1/92.
31. Smith, Capt R.M.; *CFB Shearwater - EME with a Difference*; EME Journal 1/92.
32. Turmel, Maj C.; *A Very Special Recovery Mission*; EME Journal 2/95.
33. Pineau, Capt M.S.J.; *By Skill*; EME Journal, Summer 92.

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was to learn, the team won the half-section match and several other competitions. On the final day of competition, the Soldiers Cup, a two-mile run in full gear followed by a rapid attack on an enemy position, was won by the CFB Ottawa team of Master-Corporal S. Chipchase and Craftsmen S. Korzeniewski, Foreman and M. Robinson.[34]

In another example of skilled teamwork, the technicians from EME Squadron, 8 Wing Trenton completely refurbished a Ferret scout car for the Canadian War Museum. The project took seventeen months of hard work and determination involving both military and civilian technicians from the squadron and from the Ontario Regiment Ferret Club in Oshawa. The Ferret was proudly displayed on parade in Trenton on 10 May 1994, on the occasion of the squadron's 50th Anniversary parade. In August several members of the workshop who had worked on the project travelled to Ottawa where they presented the Ferret back to the Museum. In her presentation address Captain H.J. Stewart noted the team's pride of craftsmenship in ensuring that part of Canada's military history was properly preserved. Master-Corporal R. Pettit, who was one of the principle workers for the project, drove the Ferret for the occasion.[35]

In the Dockyards

Although the formal association between EME and the Navy has changed over the years, there have always been informal ties between workshops and the dockyards. In December 1956, when the troops and vehicles of 56 Infantry Workshop, RCEME, sailed from Halifax to Egypt, they did so in the aircraft carrier HMCS Magnificent. On the unification of the Canadian Forces, the RCEME workshops located in Esquimalt, Halifax and St John's became the land maintenance sections of base and station establishments.[31] The EME Section at Maritime Headquarters advises the Commander on all matters relating to the Land Maintenance System, interprets and implements NDHQ EME policy and ensures that EME sections at bases and stations are operating in accordance with that policy in providing maintenance support to the navy.

The BEME workshop in CFB Esquimalt served a regular force infantry battalion and a combination of navy, reserve and cadet units. It is an intermediate sized workshop of 50-60 personnel in five locations. For 3 PPCLI, the workshop performed second-level repairs and all FCS and weapons repairs. For CFB Esquimalt first and second level repairs are performed on everything from staff cars to outboard motors.[36]

When challenged, EME Craftsmen can beat the sailors at their own game. As part of the 75th anniversary of the navy, June 1985, Base Maintenance CFB Esquimalt entered the MARPAC beard growing contest. On behalf of his fellow Craftsmen, Master-Corporal J. Steffan won in the Best Beard category - by a whisker![37]

Contemporary EME workshops face the common pressure of ensuring that a stable civilian workforce is encouraged and maintained. In 1988, a plan by BEMEO at CFB Halifax was put into place to establish a civilian apprentice training program - commonplace at 202 Workshop and at the Ship Repair Unit (Atlantic). The apprentice program employed four vehicle mechanics and two painter/autobody worker apprentices, with training at a workplace and formalized classroom work. The apprentice training program at the BEME Section fell under the program title of General Labour-Apprentice Training Program and was started at CFB Halifax to encourage qualified journeymen to compete for vacant jobs within the workshop, thereby helping to create a stable section workforce.[38]

Over the years, the BEME Section of CFB Halifax has taken on many unique taskings. On June 27, 1992, EME personnel removed a Soviet T-72 tank belonging to the East German Army from an automobile transport ship at Dartmouth. Large ropes were used for the tank tracks to drive over and a 5-ton wrecker from vehicle section was used to move the disabled tank. The successful tasking took nine hours.[39]

Halifax Workshop is rich in its proud history of naval missions. In 1987, HMCS Preserver headed for an unstable Haiti to evacuate Canadians and the Halifax EME Workshop prepared the .50 inch machine guns and trained the sailors in the operation and maintenance.

The Iraqi invasion of Kuwait in 1990 demanded the refit of the Canadian Task Group, from anti-

34. *CFSAC 1990*; EME Journal 1/91.
35. Stewart, Capt H.J.; speech notes at the Canadian War Museum, Aug 94.
36. Luden, Lt R.; *From Maritime Command: BEME Workshop - CFB Esquimalt*; EME Journal, Spring/Summer 90.
37. *LEME Beats Navy at Their Game;* EME Journal 2/85.
38. *CFB Halifax Base Electrical and Mechanical Engineering Section: Civilian Apprentice Training Program*; EME Journal, Spring/Summer 90.
Escobar, Lt; *T-72 Arrives!*; EME Journal 1/94.

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submarine role to an air defence and surface interdiction capability. EME Staff in Maritime Command Headquarters became responsible for all army equipment required by the ships, and the Base Halifax Workshop serviced and repaired large numbers of weapons, night vision devices and radios. Shipboard guns were overhauled and mounted by weapons technicians from Chatham and Gagetown. The tasks were near-endless, but once again EME pulled out all the stops to ensure that the navy was in full readiness for Kuwait.

Communication Command

At the end of the 1980s, Communication Command consisted of the Canadian Forces Supplementary Radio System, regular force Communications Squadrons on most bases, a Communications Group including a number of specialist units, and a Communications Reserve. It was a mixed bag of lodger units on other commands' bases and stations in all corners of the country - Masset, St-John's, Alert and Bermuda - and most points in between.

Before 1988 all matters concerning the maintenance of vehicles, generators and weapons were dealt with by NDHQ staffs. But no long-term planning of maintenance support was being done. "Therefore, the position of Staff Officer Maintenance Land (SO Maint L) was established in January 1988," recalls Captain J.C.D. Turmel, the first incumbent in the position. "There was much to be done - publications ordered, inspection schedules set up, maintenance visits made, problems identified and solutions implemented. In 1988-89 alone, I visited 42 Reserve and Regular Force Communications Units."[40,41]

CFS Alert, established as a military station in 1958, is located 817 kilometres from the North Pole. It is shrouded in darkness for six months in winter, with temperatures down to -80°C. In the summer, it has eternal daylight with temperatures 'up' to 0°C.[42] The only way in or out is by air. In 1990 two specially-designed crash and fire rescue vehicles were purchased for the station, reflecting the importance of the runway on life in the station.

The five or six EME maintainers at Alert are part of the Station Transport Section and all are engineering and airfield ground support equipment qualified. Manning is scheduled in six-month tours by vehicle technicians from bases all over Canada and roughly 300 Craftsmen have done tours at Alert. There is a wide variety of equipment in use and some fairly unique pieces, such as the rock crusher and the recovery vehicle - a modified FTV800 called "Sadie!" The vehicle technicians are busy because "the Arctic temperature and rough terrain play havoc with the heavily-used SPV fleet."[43] Repairs consist of first, second, and some third line, which must be done in Alert, and ingenuity is a necessary asset for the technicians, since parts or proper tools are not always available. With only one resupply flight per week in the winter, technicians often wait for parts for over a month.

The worst duty that a technician can get is recovery in winter: it makes even the young feel old! There are many amenities and activities in Alert - gymnasium, radio club, movies, etc - to ease the isolation. The quarters are called Houses and each has its own rules and name. The MSE operators, supply and EME technicians live in Monster House. When talking about Alert people usually mention the weather, rabbits and wolves, but they forget to mention the strong emotional bonds forged during a tour in this isolated station in perhaps the harshest environment in the world.

The most westerly EME workshop in Canada is the one-technician shop in CFS Masset in the northern Queen Charlotte Islands. "He looks after 20 trucks and buses, the four outboard motors of the station ground search team and numerous other small engines and pieces of equipment. His shop is one of the best-equipped for its size in the Canadian Forces," noted Warrant Officer P.G. Stauffer, the Station Transport Officer in 1990, "It has a 5-ton hoist, portable arc welder, wheel alignment kit and electronic wheel balancer. Any repairs that must be done by local contract must go to Prince Rupert, 130 kilometres to the east on the mainland. Our EME master-corporal vehicle technician is the only true mechanic on the island!"[44]

Canadian Forces Europe

40. Turmel, Captain C; *An EME Officer with Communication Command*; EME Journal Spring 1989, pages 8-9.
41. *Communication Command Update*; Eme Journal Winter 1990, page 30.
42. The Canadian Encyclopedia, 2nd Edition, Hurtig Publishers, 1988.
43. *Alert: the Winter Playground on Ellesmere Island*; EME Journal 1/91, pages 30 and 31.
44. Stauffer, WO P.G.; *Canadian Forces Station Masset B.C.*; EME Journal, Winter 90, page 16.

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The decision to amalgamate command of Canadian Forces Europe (CFE) was a result of Unification of the Canadian Armed Forces in 1968 and the subsequent reductions. 1 Canadian Air Division was disbanded in 1970 and its remaining squadrons were located to CFB Baden. At the same time 1 Canadian Mechanized Brigade Group was reduced to 2,800 and moved to CFB Lahr. In 1970, one infantry battalion was located in CFB Baden.[45]

The Base Maintenance Land (BML) sections of both bases reflected the unique operational readiness nature of CFE. "Our establishments were always manned at 100% with a minimum of QL5 tradesmen," Captain D.E. Harrison noted in 1985. "As well there was always enough money to send work to contract. So although the workload was heavy and we often worked overtime and participated in base defence drills, we could keep up with the workload."[46]

BML Baden had a staff of 50, half military and half civilian. Its vehicle dependency was about 450 including bombjacks. The priority was ensuring that all the ground support equipment was serviceable and available to support flying operations. Occasionally this led to some interesting recovery tasks. In May 1990 an aircraft refueller with 18,000 litres of fuel on board overturned in front of a hardened aircraft shelter with a fully armed CF-118 fighter inside. The base fire fighters quickly doused the whole area in foam and the construction engineers built an earth wall to contain spilled fuel - fortunately there was very little. Master-Corporal B. Fleming removed the drainage valve and the fuel was drained. An earth ridge was packed against the vehicle on one side. Then under the direction of Sergeant S. Richard and using two 5-ton wreckers - one to roll and the other to control - the fueller was righted with no further damage. It was an 'interesting recovery task!'[45,47]

Closeout of CFE. The decision to withdraw Canadian troops from Europe led to a two-year program to closedown CFE. "One unavoidable element of military life is change. In service to our country, we as CF personnel face new challenges on a regular basis. We fully accept a variety of taskings in the work place, and on occasion the uprooting of our home lives", noted Corporal J. Rato in 1994 as the closedown of CFE was winding down. "Solid leadership, hard work, and large doses of innovation facilitated this metamorphosis. After 25 years of reign, this giant did not go quietly."

Once the decision had been made, vast quantities of equipment had to be inspected, packaged, stored and shipped to 25 Canadian Forces Supply Depot in Montréal. A special Material Processing Centre (MPC) was set up and staffed with EME and logistics technicians. The first stop for material destined for Canada was the MPC inspection cell, which provided depot standard materiel inspection and helped ensure that over 55,000 items met a common and consistent standard. Inspectors had to be alert for material requiring special handling. The inspection team's untiring efforts helped to ensure that clean, serviceable equipment would be available to units back home.

The Weapons Inspection Team, for example, operated out of a former command bunker called "The Vault". Over 5,000 weapons were received from units. In addition, under an amnesty program, units turned in over 100 machine gun barrels and breech blocks. The MPC carpenter shop built customized crates and containers for equipment processed by MPC technicians. The shop's material technicians produced over 200 specialized containers a month. Their efforts went along way in preventing possible damage to equipment during storage and transport.

Base Maintenance Land (BML) Lahr had many closure-related challenges. Its technical support reached out to over 41 different units, sections, detachments and organizations in Belgium, Cyprus, Holland, Germany and the former Yugoslavia. As personnel and equipment was repatriated unit responsibilities were transferred to BML. In May 1992, it assumed responsibility for the disposal of the private motor vehicles (PMVs) left behind by departing service people. Over 871 PMV's were scrapped through BML. Vehicle recovery took on a new perspective. In October 1994, BML Lahr received a request to recover an American APC (M113) originally sunk in an APC swim training area for use by combat divers. Working in conjunction with the Leopard ARV team and volunteer divers from the Lahr Scuba Diving Club, a recovery crew extracted the APC from the depths of the Baggersee.

As the closedown got into full gear, the UN Mission to the former Republic of Yugoslavia (FYR)

45. Nicks, D.A.; *Canadian Forces Base Lahr 1967-92*; Department of National Defence, 1992, pages 33 and 37.
46. McCandie, Maj I.; *40 years; 1953-1993, 4 Wing Canadian Forces Base Baden Sollingen*; Esprit de Corps, 1994; page 8.
47. Shearing, Lt; *An Interesting Recovery Task*; EME Journal Winter 90.

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started and some equipment stored for repatriation had to be returned to service. Over 700 vehicles and 1,800 pieces of equipment were inspected, repaired and painted in UN colours. In March 1993, an urgent need arose for seven Tow-Under-Armour (TUA) to be specially modified and sent to the FYR. The vehicles had been stripped for return to Canada. It took the combined efforts of all CFE maintainers plus an NDHQ team to get the work completed on time.

The weapons section was granted special authority for local disposal of security containers and disposed of 200-plus safes and cabinets. Many of these required forced entry procedures, since codes and keys had repatriated with their owners. The Leopard R&O team, operating from BML lines, inspected and preserved 70 tanks which had been rebuilt for the CF by the German government.

As CANEX scaled down, EME technicians provided after-hours repairs and technical support to remaining families, and three were attached to the Base R&D Section as inspectors. They had to inspect and process all non-serviceable kit returned from units or rejected by MPC. Handling 100 to 200 line items per day, each with its special quirks, was a challenge.

Through all this Lieutenant-Colonel D.N. Redman and Major A.G. Hall in the Base Technical Services Branch encouraged and supported extracurricular activity and kept troop morale high through a sad period in CFB Lahr's 25 year history. As Corporal Rato recalls, "Bonspiels, rotation dinners, and closure milestone celebrations gave remaining EME personnel good opportunity to put serious dents in Germany's schnitzel and beer supply. Our civilian employees, many of whom had supported the Canadians for over 25 years earned a place in our memories and in our hearts."[48] Finally in August 1994 the Canadian Flag was lowered a final time. It was, "Farewell Germany. Auf Widersehen CFB Lahr."[49]

48. Rato, M/Cpl J.; *An EME Farewell*; EME Journal 4/94.
49. Canadian Press; *Departing troops lower flag at Lahr*; *Ottawa Citizen*, August 1994.

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15

Chapter 15 - EQUIPMENT ENGINEERING

Land Engineering Test Establishment (LETE)

In the area of research, test and development, relatively few members of the Branch/Corps have had the opportunity to be a part of this important facet of the life of the Corps and Branch. Of the many establishments that have conducted testing and development work for the Canadian Army and Canadian Forces, the one most closely associated with RCEME/LORE was the Land Engineering Test Establishment (LETE), Orleans. LETE is the successor of 1 Proving Ground Detachment (RCOC) which had been formed in 1941 to provide a proper facility for Canadian military vehicle research (see page 79). On October 1946, 1 Vehicle Proving Establishment, as the unit was then called, was redesignated as the Vehicle Development Establishment (VDE).

At that time, as part of immediate post-war reorganization (see page 186), the Directorate of Vehicles and Small Arms in National Defence Headquarters and the Army Engineering Design Branch of the Department of Munitions and Supply became part of VDE. Its authorized establishment was 10 officers, 87 other ranks and 71 civilians for a total strength of 168. Its role included the design of all tracked and wheeled vehicles required by the Canadian Army, research and development of ideas and projects of an experimental nature, maintenance of records of production facilities available and convertible to vehicle manufacture, and the application of tests to evaluate vehicle performance and reliability in relation to military requirements. The Commanding Officer was a major. In March 1954 the unit was redesignated the Vehicle Experimental Proving Establishment (VEPE) with a strength of 7 officers, 78 other ranks and 25 civilians.

In 1958, VEPE became part of the Army Development Establishment (ADE) which, in addition to VEPE, included the Engineers Stores Development Establishment and the Canadian Signals Research and Experimental Establishment (CSREE). ADE had a strength of 65 officers, 152 other ranks and a number of civilians. It was responsible for the engineering activities of design, development, production and post-production use of Canadian Army equipment, with the exception of such items as photographic, medical, dental, clothing and general stores. Headquarters ADE was on Argyle Avenue, the Experimental Test Wing was at the Proving Grounds on Montréal Road near Orleans, and the Electronic and Electrical division was located on National Research Council grounds in the former CSREE accommodation.[1]

In September 1961, ADE became the Army Equipment Engineering Establishment (AEEE). Its strength was 63 officers, about 140 other ranks and a number of civilians. In December 1968, as part of Integration, AEEE, the Mobile Support Equipment (MSE) section from the RCAF Central Experimental Proving Establishment (CEPE) and the Canadian Naval Electronic Laboratory were combined to form LETE. The strength was 13 officers, 121 other ranks and 107 civilians. The commanding officer was a lieutenant-colonel.

By the 1980s, LETE consisted of Land Tactical Electrical Engineering Squadron (E Sqn), Mobility Systems Engineering Squadron (M Sqn), Reliability and Maintainability Engineering Squadron (R&M Sqn), and Logistics Squadron (Log Sqn). At the Land Tactical Electrical Engineering Squadron, members designed, developed, tested, and evaluated communication, electronics and electro-optics equipment. E Squadron also had limited capability to manufacture specialized equipment and systems for DND and other user departments. The unit was organized into two divisions; Engineering Division, and Engineering Support Division. In June 1987, the near-endless renovations taking place at M-23 building in the NRC compound were finally completed, and E Squadron moved back into their renovated accommodation. However, the renovations resulted in a loss of work space and LETE adopted an objective to have E Squadron relocated

1. Springford, LCol L.A.; notes, 1975.

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to the Orleans site in 1994.

The expertise of Mobility Systems Engineering Squadron was in land force vehicles and weapons, ranging from motorcycles and snowmobiles to main battle tanks, field engineer equipment to airfield ground support equipment, and pistols to self-propelled 155mm howitzers. The primary functions of the squadron were to undertake engineering testing and evaluation in the field and in the laboratory. Due to their unique nature, squadron facilities were occasionally made available to commercial interests. The unit was organized into three divisions: Test and Evaluation Division, Measurement Systems Division, and - created in 1990 - the Mechanical Support Division. 1990 also saw the weapon engineering role transferred from E Squadron to M Squadron, and the Weapon Section of Test & Evaluation Division was created.

A major change in LETE took place in 1987 with the formation of the new Reliability and Maintainability Engineering Squadron. Originally located at 202 Workshop Depot, Montréal, under the name of Land Maintainability Engineering Division (LMED), the 65-person squadron officially came under the command of the CO LETE on 1 April 1987. R&M supported the Land Maintenance System by providing expertise in the fields of repair and maintenance procedures, and initial provisioning and scaling of repair parts. A multi-disciplinary organization, it employed senior technologists in the fields of vehicle, weapons, radar, electronics, optics, communications, and materials. In addition to the above, R&M Squadron provided statistical analysis services to reliability, availability, maintainability, and durability (RAMD) testing conducted by LETE on major weapons systems and equipment. R& M Squadron consisted of two Divisions: Repair Parts Scaling Division, and Maintenance Techniques Division.

The previous year - September 1986 - saw another major change taking place when LETE began occupying the brand new $20M, 16,000 square metre K.J. Rodgers Building, named in memory of Corporal Kevin John Rodgers. A test driver who was killed in the line of duty, in 1978 Corporal Rodgers was testing the worthiness of an APC's track by driving an APC on the proving grounds of LETE. After a rigorous session of driving, the track broke, sending the APC into a fatal skid down a 12-foot ditch. On March 11, 1987 a ceremony attended by Cpl Rodgers' wife and daughter was held at LETE to dedicate the new building in his honour. A plaque with a photo of Cpl Rodgers was mounted in the front lobby.

The year 1987 was a year of many accomplishments. In addition to the dedication of the K.J. Rodgers Building, the creation of a new squadron, and the move of E Squadron, the LETE Cadet Corps was created. The 3018 LETE Royal Canadian Army Cadet Corps was sponsored by the Orleans Legion Branch 632 and was approved on 15 September 1987. The Corps rapidly formed and expanded to a maximum of 125 cadets by the end of December 1987.

Over the years many attempts were made to introduce a unit crest for LETE. The objective was a design that would represent the unit as a whole, and at the same time conform to the rules of heraldry. A crest designed in the mid-70's represented all aspects of the unit's activities, but because it did not meet heraldic requirements it could not be approved. A crest without the crown was used unofficially by LETE until a new design was approved in July 1981.

Commissioned by the commanding officer, Lieutenant-Colonel A.L. MacEachern, with the assistance of Mr. H.W. Banks and suggestions from both past and present members of LETE, a design was submitted to NDHQ/Director of Ceremonial. The new crest accomplished the aim of representing the unit as a whole by using broad emblematic descriptions; the gear wheel represents mechanical activities, the lightning flash represents electrical/electronic activities and the crossed swords indicates that the unit, for the most part, supports the army. The selection of LETE's motto - "Labor Omnia Vincit" - translates fittingly as "Perseverance Overcomes All Difficulties".

The official unveiling of the crest took place on 7 April 1982. It was at this time that the unit took the opportunity to present the first new crests to those members of LETE and NDHQ project officers who persevered and obtained approval for the new LETE development plan.[2]

There are many examples of vehicle testing and development carried out at LETE and its predecessors. However, a uniquely Canadian contribution to the field of vehicle design has been in the area of all-terrain/over-snow vehicles.

Hailed by US experts as the most significant advancement in tracked vehicles since the first British tanks rumbled into service in 1917, the Carrier, Cargo, Light Articulated was introduced on 30 May 1957.

2. *History of LETE Crest*; EME Journal Spring 84; 309

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Better known as the RAT, it made headlines throughout Canada, the United States and most NATO countries as a vehicle capable of traversing almost any terrain while carrying 600 pounds and towing an additional 1,000 pounds.

The statement of military characteristics for the vehicle was approved in September 1955. It was to be a light, over-snow prime mover capable of carrying a load while also towing infantry toboggans over snow as well as over northern terrain in the summer. In June 1956 approval was given for the development of six prototypes to be built by Canadair Ltd of Cartierville, Québec. These prototypes were a continuation of design work which had begun some five years earlier at Army Headquarters and at the proving grounds and which was aimed at improving the mobility of tracked vehicles on soft terrain. One of these prototype RATs is located today in the Worthington Museum in CFB Borden.

Conventional tracked vehicles, even those with very low ground pressure, have difficulty cornering on soft terrain where, because one track moves slower than the other, the track digs in. Consequently, the RAT's steering system was designed so that it allowed the tracks to move at the same speed while turning. This was accomplished by making the vehicle in two parts, each part driven by two tracks but with steering accomplished by joint articulation. Thus the vehicle steered by "moving its tail from side to side." A pre-prototype articulated rig was tested in the winter of 1955 and reports described it as being superior to any light vehicle tested up to that time.

The six prototypes of the revolutionary articulated vehicle were hand-made at Canadair in the fall of 1956 as the culmination of five years and $300,000 of research and development. The RAT was powered by a standard Volkswagen engine with minor modifications. The modified Volkswagen gearbox powered all four tracks with no provision for differential drive between tracks or parts. The front part accommodated the driver, the engine and the main transmission, leaving the rear part clear for cargo. Steering was effected by controlling the angle of articulation between the two parts by means of cable and pulleys and a ball-joint. A spiral drum - mounted on the steering column - took in cable from one side of the vehicle and paid it out the other as the rear unit moved through an angle of 40°. The drum was designed to take up the slack in the cable due to articulation. Spring-boxes were connected to each fixed end of the cables to maintain the cable tension during hogging, sagging and rolling movements."[3]

The RAT underwent extensive testing at VEPE and at several field test sites throughout 1956 under the direction of a VEPE test officer. Tests in deep snow, swamp, sand and water, up and down hills, on side slopes and over obstacles proved the RAT to be the best vehicle of its type anywhere. To the dismay of the design and test team and to the Army, the RAT fell victim to the political cat and was never produced. {The present-day Swedish BV206 employs articulated steering, a testimonial to the engineering accomplishment of the Army design team.} The prototype vehicles were given to the Airborne Regiment in 1968 where they served for the initial years of its formation.

A similar disappointment lay in store for the Design Department of 202 Workshop Depot. Established in 1961 to develop SEV kits for the Bobcat, a Canadian-designed and developed APC, the department included a senior engineer, six design engineers (usually RCEME officers) and a technical and administrative support staff. The demise of the Bobcat program in December 1963 spelled the end for this department. It was as serious a blow to the Corps as the cancellation of the Avro Arrow was to the RCAF.

Factors contributing to the cancellation of this project included inadequate definition of the scope of the program and changing design requirements. These led to delays, re-funding and re-approval at various stages. By the time the vehicle was undergoing final engineering tests by an AEEE test team at the proving grounds in 1963, similar vehicles were being brought to production in the UK and the USA."[4]

1992 brought exceptional challenges to LETE's doorstep in support of UN operations - design and install three satellite ground terminals; design, test and manufacture Bison ambulance and engineer variants; develop and assemble battlefield damage repair kits and; modify M113 gun shields. As usual, the men and women of LETE responded with tenacity and speed.

In September 1992, LETE was assigned the task of installing the Intelsat Terminal with ancillary equipment in an S-250 shelter for deployment with OP CORDON in Somalia. In one month, E Squadron tested the satellite ground terminal, prepared the shelter and added an air conditioner. In the same time, M

3. Apprentice Yearbook 1959, page 64.
4. *House of Commons Special Committee on Defence*; 19 November 1964.

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Squadron prepared two trailers, one for the antenna system and one for a 10 kW diesel generator, and mounted the shelter on a 5/4 ton diesel truck. A few months later, two other ground satellite systems were required for the former Yugoslavia and for Somalia. During the UN operations, the three ground satellites were considered extremely important because of the direct relay they provided with Canada.

In the planning stage of OP CORDON in Somalia, LETE was tasked to design, prototype, and manufacture four Bison ambulance SEV kits within a month; ready for the Airborne Regiment's departure overseas at the end of October 1992. After modification the vehicles were able to carry up to four casualties, each able to receive oxygen if necessary. Additional lighting and storage space was also installed in the vehicle. During the month of October, again in support of OP CORDON, LETE was given just two weeks to convert five Bison infantry carriers into an engineer variant, capable of stowing engineering tools and a hydraulic hose reel for powering field engineer hydraulic tools. The newly-configured vehicles were then sent to Somalia where they proved extremely useful. Additional tasking in support of OP CORDON came in November, when LETE personnel were tasked to design and assemble a battlefield damage repair (BDR) kit and to produce installation instructions for the Bison MRT. Maintenance Techniques Division's (MTD) vehicle section created a kit for the Bison MRT and also created a portable kit that would fit any vehicle. {The kits can return equipment to a temporary or permanently-serviceable condition. In December 1992, a requirement was identified to install gun shield kits on M113s deployed in the former Yugoslavia as part of the Canadian Contingent, United Nations Protection Force (CCUNPROFOR). The gun shield greatly enhanced the protection of M113 crew members and saved the lives of Canadian soldiers several times during the peacekeeping mission.}

For their quick and innovative responses in support of the UN missions, LETE received the Chief of the Defence Staff Commendation.

It was announced on 22 February 1994 that LETE would close as a result of the reduction program in National Defence. All work on tasks ceased on 1 August 1994 and, one month later, a closure ceremony was held on LETE grounds."[5]

Defence Research Establishment Valcartier (DREV)

Turning to the field of armaments, EME officers and tradesmen have participated in Canadian Armament Research and Development Establishment (CARDE) since it was formed in 1945 at Valcartier, Québec, and now called Defence Research Establishment Valcartier (DREV). The aim of this unit is to study and develop explosives, propellants, weapons, ballistics, and projectiles".[6]

Over the years weapons technicians at DREV have participated in projects involving all aspects of prototyping, producing and maintaining weapons systems. They have also built a variety of unique test and development aids for scientists and engineers in the unit. For example, a 155mm gun carriage has been modified to become a "universal" gun mount. This mount can take a 20-pounder, a 105mm or even a 110mm barrel for the proofing of ammunition at the Proof, Experimental and Test Establishment (PETE) at Nicolet, Québec. One task was to modify an old World War One 4.5 inch gun mount to take an 81mm mortar for proof firing the mortar in the horizontal position.

In 1968 a project was set up at CARDE to improve the response time of artillery units in setting up to engage targets. It was an attempt to apply computer technology to speed up the laying and firing of guns. This was the start of the MiliPAC project (see page 190), a project in which members of the EME Branch have pioneered the application of new technology to military problems. In the MiliPAC project the time from arrival into position to commencement of firing has been reduced from thirty to five minutes.[6]

DREV projects continue at the forefront of technology. One example is the development of insensitive munitions, i.e munitions which perform reliably as intended but are less likely to detonate accidentally by accidental heating or if struck by bullets or fragments."[7] Two Leopard Tank projects, the Muzzle Reference System and Sight Linkage, were designed to improve the accuracy of gun fire. Both projects were successful and resulted in technology transfers to the private sector."[8] The DREV electro-optical range is unique in its sensitivity and accuracy over extremely wide temperatures and humidity."[6] In

5. *House of Commons Special Committee on Defence*; 19 November 1964.
6. *Sentinel, Sentinelle*; magazine of The Canadian Forces; 1983/3, page 4.
7. *CRAD 1991*; Research and Development Branch REview, DND report, 1992; page 19.
8. Tardiff, op.cit., page 37.

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1994 two EME officers, one an ammunition technical officer, were on the staff of DREV.

Perhaps the most important contribution of EME technicians and officers at establishments such as DREV is bridging the gap between civilian engineering and military use of equipment. A type of programmed small arms targets was developed at DREV for the Combat Training Centre at Gagetown, NB. Chief Warrant Officer E. Bailey, a weapons technician at DREV, worked with the civilian technologist assigned to the project in order to advise him on range control procedures and the operation of an infantry section in battle.

Land Software Engineering Centre

The mission of the Land Software Engineering Centre (LSEC) is to provide advice to managers and project personnel in the design and development of software; provide the expertise required to perform corrective, perfective, adaptive, and preventive maintenance on existing software products; and develop the software expertise needed for the Canadian Army.

The cornerstones of the LSEC are the life cycle application managers (LCAM); highly trained military officers with degrees in the fields of computer science or software engineering. They are the "hands on" personnel that assist the individual project directors, program managers or life cycle managers in designing, re-designing, and maintaining the software used by the Army. They are the link from the customer to the individual software product. With the shrinking defence budget, the LSEC is one approach to "working smarter."[9]

Updating/modifying equipment

Volumes could be published on the many equipment updating and modification projects led or supported by Canada's Craftsmen, but the following example will convey the degree of cooperation, planning and teamwork that signal Craftsmen involvement.

On 1 November 1994, the Commander of CCUNPROFOR dispatched an immediate operational requirement (IOR) message to NDHQ concerning the lack of blast and ballistic protection offered to drivers of soft-skinned wheeled vehicles. In response a ballistic armour team was formed to ensure that an effective ballistic protection system was developed, manufactured and fielded as soon as possible. Major Brunelle from DLR refined the specific requirements and Major P.F. Lemieux from DGLEPM wrote the statement of work and the technical requirements. There were several important issues that had to be considered, the most important being the level of ballistic protection required and the weight of the armour itself - the use of ballistic armour was not foreseen when the LSVW, MLVW, HLVW and Kenworth were fielded, and as a result, these vehicles had no extra capacity to accommodate the additional weight of an armour system.

The team decided that an international competition would prove advantageous and companies from Germany, England, USA, South Africa and Canada solicited interest. The competition was won by DEW Engineering of Ottawa.

The ballistic armour protection was a composite armour system consisting of ceramic tiles adhered to a glass-reinforced polyester (GRP) backing plate, which would offer a _ weight saving over conventional steel armours. Mine blast protection armour protection provided by GRP alone was bolted to the vehicle floors. Ballistic protection on the doors and front was provided by bolt-on plates of GRP and ballistic glass two inches thick, which was mounted inside the windshield, and replaced the side windows. A 22,000 BTU air conditioner was installed in the cab roof to ensure that reasonable cab temperatures were maintained in hot environments. For each type of truck DEW Engineering designed an installation kit containing plates, glass and installation material. Each kit was packaged in a crate that could be carried on the back of the vehicle.

The installation team was headed by Chief-Warrant-Officer G. Beaudoin of DGLEPM and included two vehicle technician sergeants, eight "any trade" corporal/privates and a DEW Company representative. Two reconnaissance visits proved to be invaluable. The team arrived with all materials required to install the kits. Feedback from the Canadian troops regarding the armour kits was very enthusiastic and positive."[10]

9. Boyce, Maj R.G.; notes to the author; 1994.
Lemieux, Maj P.; *Armour Protection Systems for Soft-Skin Vehicles*; unpublished article, 1995; 532.

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Colour Photo Section

Normandy Beach by David Sheperd - Sherman Beach Armoured Recovery Vehicle Mk4 "Sea Lion" towing a Sherman Duplex Drive Amphibious tank. *Courtesy Corps of REME*

Prairie Service Battalion by J. Wandler - 1989. EME reservists changing a MLVW powerpack during summer exercises in Wainwright. *Courtesy LCol A Fahey*

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The Gulf War - EME was everywhere the action was! Vice-Admiral R.E. George talks with Master-Corporal K.D.M. Brown on board the HMCS Protecteur. *DND*

1 Canadian Field Hospital Maintenance Platoon at Al Quaysumah near the Kuwaiti-Iraqi border *Lt W.P. Proteau*

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EME on display! A collector's display at a Vancouver militaria show – 1993. *Mr R Rodgers*

EME uniforms 1940-1991 - *left to right* Craftsman A.D. Molloy in pre-Integration Army "TWs"; Master/Corporal R.I. Wiley post-Integration greens; Sergeant F.B. McMurrer in pre-Integration Air Force battledress; Master/Corporal H.T. Bailey in World War Two Battledress; Sergeant E.J. Crocker in Post-War Battledress. *CFSEME*

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The Horse is Back! Rebadging 1991 at bases across Canada - *clockwise from top left* - The EME Branch Advisor, Brigadier-General R.N. Fischer rebadges the Branch Chief Warrant Officer R.E. Roy; *DND*. Captain(N) F.W. Gibson rebadging Major R.F. Danahy at Esquimault; *DND*. Colonel J.A. Boucher rebadging Craftsman K.D. Armstrong at Cold Lake; *DN*. Lieutenant-Colonel L.G. Gillis rebadging Master Warrant Officer W.D. Phillips at Greenwood. *DND*

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Skill demonstration teams - *top:* The Airborne Maintenance Platoon "Jiffy Jeep" team - 1984 on the 40th Anniversary Celebration of the Airborne Regiment;*MCpl M. Holland; bottom:* EME 50th Anniversary Skill Demonstration Team - 1994. Performing at the Trenton Air Show. *DND*

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The EME Honour Roll. The project to visit RCEME graves - *top left:* Craftsman V. Cavanagh, a veteran of the Italian campaign 1943-45, at the Cassino War Cemetery, Italy; *DND. top right:* Captain G. Boleszczuk and Sergeant A. Dunham at the Brandon Manitoba Cemetery; *DND. Bottom:* Lest we forget. Annual Remembrance Day parade at the RCEME Gates – 1995. *DND*

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EME on display during the EME 50th Anniversary. *Top;* the 1994 DND Mobile Display Trailer touring Eastern Canada and *bottom;* the courtyard of the Canadian War Museum. *DND*

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Top: Maintaining Canada's military heritage. A Ferret Scout Car refurbished by EME Squadron 8 Wing (Trenton) for the Canadian War Museum. *Canadian War Museum*
Bottom: The REME Band at the EME 50th Anniversary Parade. *DND*

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Top: An EME 50th Anniversary local project. The EME Workshop sign at CFB Trenton painted by Corporals M. Orford and I. Mackie. *DND*
Bottom: Skill-at-Arms competition - Brigadier-General V. Pergat presents the first place awards to the CFB Valcartier team. *DND*

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Top: 50th Anniversary presentations to the EME Branch. Brigadier J. Graham representing the Corps of REME presenting the REME Alms Dish to Brigadier-General V. Pergat, EME Branch Adviser, at the EME 50th Anniversary Parade. *DND*

Bottom: The 50th Anniversary of the Corps of REME, 1 October 1992. Colonel M.C. Johnston and Chief Warrant Officer A.E. Rest representing the EME Branch present a replica (made by 202 Workshop Depot) of Champlain's Astrolabe to Major-General M. Heath, the REME Director-General. *Joan Johnston*

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Top: EME on Parade. The EME 50th Anniversary Parade 13 May 1994 under command of Lieutenant-Colonel D.W. Clarke. *DND*

Bottom: "Cutting the sod" - September 1993 for the EME 50th Anniversary Monument - *left to right* - EME Branch Chief Warrant Officer A.E. Rest; EME Colonel Commandant M.C. Johnston; EME Branch Advisor, Brigadier-General V. Pergat. *DND*

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The EME 50th Anniversary Commemorative Monument being unveiled 15 May 1994 at CFB Borden by Craftsmen S.E.W. Facey representing future Craftsmen, Lieutenant-Colonel(Retired) J.K. Bradford representing veteran Craftsmen and General J.A.J. DeChastelain, the Chief of the Defence Staff. *DND*

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Top: EME Cadet corps. Two cadets from 3036 (Sackville Lions) Cadet Corps demonstrate rifle skills. *Maj F. Mailman*

Bottom: Opening the Lance/Corporal H.W. Grear building - June 1994. Artificer/Armourer/Staff/Sergeant R.E. Crumb, a Dieppe veteran, opened the building in honour of his comrade who was killed at Dieppe. *EME Workshop Esquimalt*

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EME 50th Anniversary National Weekend displays - historical vehicle. Three RCEME veterans and a 60-cwt Canadian Military Pattern (CMP) workshop machinery truck used by RCEME and RCASC workshops in World War Two. *DND*

The wear and tear of UN operations on vehicles - Somalia. Repairing the wheel of a Bison AVGP after it had become entangled with barbed wire. *DND*.

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RCEME Tank Transporters in Italy by Canadian War Artist, Lawren P. Harris – 1944. *Canadian War Museum*

Recovery under fire near the Sarajevo Airport - UNPROFOR by Katherine Taylor. Corporal J.J. Boudreault rescues three wounded soldiers and recovers a damaged vehicle while under mortar fire in April 1992. *Courtesy Canadian War Museum*

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Chapter 16 - BEHIND THE SCENES

While the majority of RCEME/LORE craftsmen work in the various workshops across the country and abroad, there are always those whose activities behind the scenes support these workshops with trained personnel, testing of new equipment or new ideas. The largest such activity is the School.

CFSEME

The Canadian Forces School of Electrical and Mechanical Engineering (CFSEME) has been known by a variety of official designations since Ordnance training was consolidated in Kingston in 1939. Most of the many thousands of students and instructors that have passed through its classrooms, however, simply call it (affectionately or otherwise) "The School".

The School in Kingston. At the end of World War Two, the School's designation was "A21 Canadian Ordnance and Electrical and Mechanical Engineering Training Centre." However, on the departure of the RCOC elements for Longue Pointe and the absorption of some of what was A36 Canadian Radar Training Centre, it was officially redesignated "The RCEME School" on October 1, 1946.[1]

In common with other Corps schools, the RCEME School was responsible for general military training (GMT) of recruits, trades training, instructor training, and officer training. This was particularly true during the period of expansion of the Canadian Army in early fifties. With an establishment (1949) of 28 officers, 208 ORs and 90 civilians, the School was designed to train a maximum of 422 tradesmen at one time. Due to both manpower and space limitations in Kingston, however, some training for the burgeoning Corps of RCEME had to be carried out elsewhere.

The immediate answer to the need for additional training was split into two parts, GMT and trades training. A GMT Wing of 10 officers, 57 ORs and 24 civilians was permanently established at Camp Borden (with RCIC help). This wing had an annual capacity of 240 recruits, and continued to operate until the late fifties. Solving the GMT problem inevitably created another, as the trades training courses rapidly reached capacity. Fortunately, the wartime experience of Canadian Vocational Training Schools (CVTS) (see page 84) was not far in the past, and RCEME was able to send 70 tradesmen each year to a variety of CVTS facilities across the country. Although operated to reflect civilian rather than military trade requirements, these schools turned out a graduate who was able to pass a Group 1 trade test with very little extra training or workshop experience. The result of this training could be seen as early as 1951, when a postwar peak of 600 students was engaged in trades training, and the GMT wing in Borden trained over 400 recruits. Many more officers passed through the School that year as well - 66 in fact - in addition to the 120 COTC officer cadets on various phases of training.[2]

The RCEME School in the forties and fifties consisted of a HQ and two wings; training and administrative. The administrative wing was organized as a HQ, administrative staff, and holding company, while the training wing contained a HQ and five sections; artisan, armament, corps and GMT, telecommunications and electrical, and vehicle. The philosophy of technical training, noted Sergeant J.D. Snell, an instructor in the vehicle section at the time, "was not basically learning particular equipments. That came in due course. Types of systems, how to recognize them and the type of adjustments in each were taught instead. A case in point: on vehicles of that day, brakes were of three basic types - Wagner-Lockheed, Bendix-2-Shoe and Huck. With knowledge of these three types of designs, a trained mechanic could take any piece of equipment and having knowledge of field expedients, make it work (even with 'baling wire and

1. RCEME Quarterly 1/1, page 4.
2. Isbester, Col I.D.; letter to the author, 1977.

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chewing gum'). They were never stuck."[3]

By the late 1950's, the RCEME School had established a reputation for technical training of a high calibre. However, by 1958, Corps schools had come under heavy criticism and suspicion of high course loading, unnecessary courses and course syllabi that were expensive in staff accommodation and training methods. The problems had their roots in the immediate post war establishment of these schools. At that time, the field force was small and under strength and, consequently, the schools were forced to carry a heavy training load. The expansion of the army during the period of the Korean War and the NATO build-up in Europe forced the schools to expand rapidly. Thus, a new plan was drawn up to ensure that the training carried out at Corps schools and depots would most efficiently enable the Canadian Army to meet its commitments. Recommendations included essential training requirements of the army, the possibility of trades and signals courses being taught at one Corps School, weapon training policy, recruit training policy, and the most efficient arrangement of courses and syllabi.

By 1960, the changes at the RCEME School were settled. Its organization included a headquarters, a headquarters company and several training companies. The headquarters comprised a training and administrative staff. The headquarters company included the housekeeping and general duty personnel for the entire school. It was responsible for the administration for school headquarters and also held all personnel awaiting courses. Each of the training companies included the staff needed for internal company administration, three or four training platoons, and a maintenance platoon. This reduced establishment was capable of conducting training for a maximum of 520 students with an average loading of approximately 375.[2]

The one part of the school that was constant was the RCEME School Band. An all-volunteer drum and bugle band, affectionately called "The Band", set a standard for music, drill and deportment in the Kingston area for many years. Fittingly enough, the band's first parade (2 March 1949) was for an old friend of the Corps, Major-General C. Vokes, GOC Central Command, (see page 45) and was a resounding success.[4]

A short two years after that first parade, the RCEME School Band took the honours at a band tattoo and competition staged by the Princess of Wales Own Regiment of Kingston. With a perfect score of 100 out of 100, the RCEME School bested 20 other Canadian and American bands - a dream come true for the school RSM, Warrant Officer (Class 1) W.G. Collins, and band sergeant, Sergeant W.E. Hendon.[5]

The origins of the band were much earlier. In 1940 Private W.W. Monkman transferred from RCE to RCOC in Camp Petawawa, and was sent to Kingston to join A21 Canadian Ordnance Corps Training Centre. He became interested in bugling, learned the calls and became one of three buglers on strength at the School. In 1941, they decided to try and form a band enlisting the help of two former drummers. One day they paraded in downtown Kingston. By the end of the war the band had a strength of 40 and was well known all over Ontario. In 1945, however, it was "disbanded".[6]

It was fitting then that, twenty-two years later, Master Warrant Officer W.W. Monkman (one of the original members of the RCEME School Band led the 29 members down the streets of Kingston for the Centennial parade, 1 July 1967. He reported that the cheers and ovations that were received proved to the bandsmen that the RCEME School still had the number one military bugle band in the area.[7]

However, changes were in the wind. The RCEME School was soon to close and move away from Kingston.

Renaming the School. In September 1968, on direction from Training Command, work commenced at CFB Kingston on the amalgamation of the RCEME and RCSigs Schools. A committee chaired by Lieutenant-Colonel E.B. Creber, Chief Instructor of the RCEME School, examined the requirements and set up the organization of the new school. After some delay and last-minute changes, the new organization was approved. The Canadian Forces School of Communications and Land Ordnance Engineering (CFSCLOE) was inaugurated 12 February 1969 by Colonel A.L. Maclean (the last commandant of the RCEME School) and Colonel L.H. Wylie (the last commandant of the Signals School). Colonel MacLean became base

3. Snell, Capt J.D.; notes, 1983.
4. RCEME Quarterly 1/3, page 21.
5. RCEME Quarterly 4/1, page 10.
6. Monkman, Capt W.W.; taped interview with the author, 1995.
7. RCEME Technical Bulletin 14/1, page 32.

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commander CFB Kingston and Colonel Wylie became the commandant of CFSCLOE.

CFSCLOE was not destined to be the seat of LORE training for long. During the winter of 1969-70 a plan was formulated to move non-electronic and officer training to the accommodation occupied in CFB Borden by the Canadian Forces Aircraft Trades School (CFATS). The combination of these two schools was to be known as the Canadian Forces School of Aerospace and Ordnance Engineering (CFSAOE).[8]

Moving the School. Although authorized 1 June 1970, it was to be more than a year before the new school was actually in position in Borden. The delay was caused by the lack of accommodation: there was simply "no room at the inn" for all of the equipment that had been collected in Kingston in the quarter century of the School's existence. There was also the novelty of transferring vehicle technician training to an aircraft hangar, which took more than a little planning and preparation to sort out!

During this period of upheaval the school was conducting training under army trade specifications, designing and implementing courses to meet the new integrated trade specifications and executing a phased move to Borden. Both staff and students soldiered on in true RCEME/LORE fashion. Looking back at that era from the vantage point of the present, there would seem to be ample justification for the school to have reduced training, or perhaps to have stopped it entirely. In fact, the demand was for more rather than less. And The School provided. The newly-formed LORE Officer Training Company graduated more officers - 48 - in 1971 than at any time since the Korean War. Vehicle and Artisan (including the former Armament) Companies, whose heavy equipment had caused so much trouble in the move to Borden, literally trained on the move. For example, during the summer of 1971, one course trained on a Centurion tank turret in Kingston and then loaded it on a low-bed bound for Borden and the next course. This type of coordination naturally required the cooperation of the entire staff, according to Captain T.G. Whitehead who, along with another old hand, Captain J.S. Holt, masterminded the artisan and Vehicle Company moves respectively.

The School in Borden. The introduction of new trades' courses continued at a rapid pace. Adjustment training was initiated in some trades to bridge the gap between old and new training methods. This activity affected all LORE trades to some degree, but none more so than the old electro-mechanical and instrument trades. They were combined to form the Fire Control Systems (FCS) trade field, necessitating a drastic revision of all course standards and lesson plans.

Within CFSAOE, the School started to distinguish itself as a separate entity once more. In 1981 the LORE wing of CFSAOE was formed to include LORE Company, Vehicle Company, Artisan Company and Fire-Fighter Company. With the exception of the fire fighters, self styled as "orphans of the Military Engineer's School in Chilliwack," the remainder taught what used to be RCEME trades and, except for Artisan Company's workshop and ammunition trades, all were now LORE.

LORE Company was, as the name suggests, a stronghold of LORE esprit de corps and became more like the old Regimental Company of the RCEME School. 180 officers and 935 other ranks were scheduled to pass through the company each year. The reason for the renewed emphasis on Branch-oriented training was simple: by the mid- to late-Seventies it was obvious that most new members of LORE knew little about LORE or RCEME, and were also deficient in field craft. Adapting the training packages to meet the needs, "LORE Common Training" was born. It proved to be a great success, instilling the pride, perspective and knowledge so essential to the soldier/technician.[9]

Vehicle Company was the largest in terms of facilities and students in the LORE wing. Occupying eleven buildings and training 800 vehicle technicians annually, it sprawled across the old World War One hangar line at CFB Borden. With the Air Force flavour and mixture of former MSE technicians and RCEME mechanics, the scenes inside the buildings were as professional as ever.

As Lieutenant R.E. Saunders, Company Training Officer, noted, "For years the school lacked a proper training aid for practical work on air brake systems. One day the section was given two surplus Sicard foam trucks and a trailer, all of which employ air brakes. The trucks were reduced to bare chassis and the brake systems were completely overhauled by the instructors. The various sub-systems were then colour-coded and painted for easier identification. A console was built in which enabled an instructor to place faults into the system for trouble-shooting practice. An audio-visual package was also obtained to ensure that we

8. RCEME Technical Bulletin 16/1, page 3.
9. Vincent, Maj R.J.; taped interview, 1983.

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now teach a complete, modern package."[10]

Artisan Company was fully integrated, with Logistics, Military Engineers (MILE) (for ammunition and EOD training)[11] and Aerospace Engineering (AERE) hat badges appearing in addition to LORE. The Weapons and Electronics Platoon provided instruction for both the weapons and fire control systems technicians, and these LORE trades have seen many changes since the school moved to Borden. The change from the old electro-mechanical (ELM) trade to the new fire control systems (FCS) trade field necessitated a drastic revision of all course standards and lesson plans. In addition, laboratory facilities, particularly in the optical and motor areas, were quite inadequate for the new training. Once again there was a need for the construction of new facilities.

The weapons trade also underwent major changes with the introduction of security containers and hydraulic/pneumatic and electronic interface training. Here too, the limitations of working in former Air Force facilities tended to hamper the instructors. For example, there was insufficient roof clearance to conduct indoor turret lifts of the AVGP family of vehicles. The next major tasks facing the trade were the incorporation of the new family of small arms into the trade courses and further development of skills in the electronic interface area.

One benefit for both trades has been their collocation with avionics and other air trades. In the never-ending struggle to keep up with rapidly advancing electronic and weapons technology, it is beneficial to share problems and solutions. For example, the Air Force's struggle with the Aurora aircraft helped LORE training for the Leopard tank, while the amount of work required to gear up for the CF-18 Hornet aircraft meant a flood of electronics information that could be tapped by EME FCS technicians. By the early eighties, LORE Wing was expected to train 250 new (TQ3) vehicle technicians, 50 fire control systems technicians, 50 weapons technicians (land) and 30 LORE (Phase 4) officers per year.[9]

The Branch regains its School. Once again changes were in the wind. Air Command had shown an increasing desire to gain more control over the training of its operational tradesmen and officers. Partly as a result of this initiative, the split of CFSAOE into three distinct schools became a reality.[12] LORE Wing of CFSAOE became the Canadian Forces School of Electrical and Mechanical Engineering (CFSEME) on 1 September 1985. Colonel J.G.G. Nappert became the last commandant of CFSAOE and the first commandant of CFSEME. The new school was organized into four companies, headquarters and standards, regimental (formerly LORE), artisan, and vehicle. With a few signatures and a great deal of work behind the scenes the Branch regained its school. The school was once again the home station for all members of the Branch.

Evolution and change have been the rule rather than the exception since CFSEME commenced operations. The OA conducted in the early 1980s led to major revisions to trade specifications and trades courses. Senior technical training is provided at 6A rather than 6B and the QL7 Technical Administration course has been launched. Training was also developed and launched for the materials technician trade.

Budgetary restraints have forced staff reductions, reorganization and a reduction in total training time. The school has met these challenges head-on by learning to train smarter. The commandant and his staff have launched several initiatives to eliminate duplication, explore alternate training methods and improve service delivery.

New Buildings. Training facilities have gradually improved with the construction of buildings designed around specific technical training requirements. The first was officially opened on 14 October 1989. It houses the armament cell of artisan company's weapons and electronics platoon and is used to train weapons technicians (land) and was named after Lieutenant-Colonel Leseur Brodie, O.C., the longtime Secretary-Treasurer of the RCEME Association, reservist and wartime soldier who was awarded the Order of Canada in 1976 for his accomplishments as an engineer in war and peace (see page 259).

The second building was constructed to provide a central area for vehicle technician training and officially opened on 18 June 1993. This building provides state-of-the-art training facilities for training technicians and includes specialized classrooms and workshop floor space for 100 vehicles. The building was named in honour of Sergeant Frank Carson, who received the Military Medal during World War Two (see

10. LORE Technical Bulletin 1/83, page 32.
11. Porritt, Maj R.I.; notes, 1983.
12. *Full Circle For Our EME School*; EME Journal Fall 88.

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page 40).

The newest building was built to provide up-to-date welding facilities for training materials technicians. Officially opened on 25 November 1994, it was named in honour of Corporal William Oliver Pearson, who was awarded the Bronze Cross of the Netherlands during World War Two (see page 56).

The School today has a different name, location and organization than was conceived in 1946. However, the common thread of providing trained soldier-technicians remains, and the instructors of today show the same enthusiasm as their RCEME forbearers. This enthusiasm is aptly reflected in a sign which appeared in 1995 over the entrance to Regimental Company proclaiming it to be the "Battle School of the EME Branch!"[13]

École Technique

The école technique des forces canadiennes (ETFC) was opened on 15 April 1969. It provided initial technical training in French for military francophones and was located at CFB St-Jean. Its purpose was to give Francophone servicepersons an opportunity to attend a technical course in French in a Francophone environment. The result was the increased production of electronic tradesmen and vehicle technicians in the Canadian Forces. Sadly, because of force wide reductions, ETFC was closed 21 April 1995.[14] In its 26 years of existence, it exhibited a strong sense of innovation in making the most of limited resources.

ETFC had fourteen commandants, six of whom were EME. Of the ten CSMs three were EME. The first CSM was Chief Warrant Officer J.P. Champagne while the last was Master Warrant Officer J.P. Cyr. The school was organized into a headquarters, an electronics company and a mechanical company.[15] It was accommodated in two buildings which were constantly being updated. The mechanical company was located in an old World War Two aircraft hanger, Hanger 104.

The first basic electronics course was the basic electronics and communication training. In 1970 this was replaced by self-paced training, called Practical Oriented Electronics Training (POET). The training took from 30 to 95 days, depending on the need. Francophone ELM (later FCS) Technicians took the POET course and then proceeded to CFSEME for QL3 training.[16]

Mechanical Company was opened on 15 November 1971. Over the next 24 years about 2,000 students went through its vehicle technician TL3 (later QL3) courses. In 1989, when there were 120 students, the staff for the company was 1 officer and 19 NCMs. The technical training phase of the course was 22 weeks. This was followed by a 3-week EME Common training phase in which students learned basic field living and defensive skills and EME regimental traditions and history.[17]

At the school's closing ceremony Colonel M.C. Johnston, the EME Colonel Commandant, noted, "It was the strong RCEME esprit de corps of the school's vehicle technician instructors in the mid-1970s that lead to me writing *Canada's Craftsmen*. It was that same spirit that was a driving force in ETFC and made it such an energetic, vital institution."

AD Artillery School

During World War Two, Canada's 19 anti-aircraft regiments served at home and abroad. After the war, air defence in Canada was steadily reduced until, in 1959, it was abandoned with the closing of 210 Workshop and the Anti-Aircraft Artillery School in Picton, Ontario. With the growing threat to our NATO airfields, however, anti-aircraft capability was restored in 1974 when wartime naval 40 mm Bofors guns (Boffins) were taken out of storage and mounted in static emplacements around each airfield.[18]

In October 1983, the Government of Canada initiated a project to acquire an effective Low Level Air Defence (LLAD) system. A contract was subsequently let to provide 36 Air Defence Anti-Tank (ADATS) missile systems, 20 GDF-005 twin 35 mm guns and 10 Skyguard fire control radar systems. These systems were the most up-to-date available. Total cost was to be $1.1 billion.

13. In late 1994 Regimental Company was moved to the former public school building that had been occupied by the Canadian Forces School of Music prior to its disbandment. The old temporary buildings occupied by Regimental Company were razed.
14. Commemorative Book for the closing of ETFC; 1995.
15. Sirios, Maj J.E.S.; *École technique des Forces canadiennes*; EME Journal December 89.
16. Vachon, Capt J.G.L.; *A Twentieth Anniversary for the Canadian Technical School "ETFC"*; EME Journal Summer 89.
17. Vachon, Capt J.G.L. and others; *The Craftsman's Handbook*; ETFC Mechanical Company training book, 4th edition, 1991.
18. Wyville, Maj R.D.; *Air Defence Artillery School*; unpublished aide memoire, 1991.

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With the introduction of these weapons and the need to train both operators and maintainers together, the Air Defence Artillery School (AD Arty School) was formed on 29 July 1985 at CFB Chatham. The school comprises four batteries, headquarters, maintenance training, artillery training and 4 Air Defence Battery. There is also a workshop, appropriately named 210 Air Defence Workshop, which provides first and second line support to the school's vehicles, weapons and equipment and second-line support to the air defence battery. The DCO of the school is an EME Major.

The school was accommodated in a specially-designed building which was formally opened on 29 June 1989. Named the General A.G.L. McNaughton Building, at the opening ceremony the Colonels Commandant of the EME and the Artillery Branches affixed the Royal Cypher to a twin 35 mm gun while the EME and the Royal Canadian Artillery flags were raised. A portrait of General McNaughton wearing the uniform of the Honorary Colonel Commandant of the Corps of RCEME was then unveiled.[19,20]

In April 1995, the Air Defence Artillery School (the AD Arty School) was moved to CFB Gagetown. On St Barbara's Day, 4 December 1995, the new school's building was opened and rededicated the General A.G.L. McNaughton Building. The strong Artillery/EME bond which has developed at this school continues.[21]

Apprentice Training Plan

One group which reflected this enthusiasm and pride in craftsmanship and has left a unique mark on the Corps and Branch is the apprentice soldiers. The Apprentice Training Plan, recalled former Craftsman-Apprentice (later Colonel) L.A. Leflar, was finalized in the fall of 1952 and implemented in the Canadian Army with the enrolment of the first intake of about 38 craftsman-apprentices in January 1953.[22] They started training in two different locations. English-speaking apprentices trained at the RCEME School. French-speaking apprentices trained during their first year at the Canadian Army Training School (CATS) in Montréal. The two groups were joined at the RCEME School in January 1954.

The experience gained in recruiting the RCEME workshop for Korea had shown that there would be a problem in having enough sufficiently-educated senior tradesmen qualified to work on modern equipment. The Apprentice Training Plan was designed to help fill this need, as former Craftsman-Apprentice (later Master Warrant Officer) D.E. Montague has noted.[23] The aim of the plan was to train selected young men as soldier-tradesmen and to provide them with the required educational standards that would enable them to advance to senior non-commissioned officers. The Apprentice Training Plan, designed to be to non-commissioned officers what the Canadian Military Colleges are to officers, was well-conceived and executed.[22] Sadly, it became a victim of false economy and the last class graduated in 1968.[23]

Other armies have, since time immemorial, trained and employed "boy soldiers" (see also page 84). But this was a plan with a difference. The combination of stiff regimental training with academic courses and all-round trades' instruction was unique. Young men, eighteen years in age, graduated with a good education and a sound knowledge of the army in general, and of the Corps in particular. In addition, they had the determination that was needed to successfully complete a deliberately trying course, and the self-confidence commensurate with having done so.

Of the three elements that made up the two-year course, the majority of staff and students characterized regimental training as the back-bone. The staff knew that constant, unrelenting pressure was the quickest and best way to transform a motley crew of high-spirited sixteen-year-olds into a disciplined body of men. As former Craftsman-Apprentice R.F. Danahy has recalled, "My group arrived by train at the Kingston train station. We were met there by a driver and were herded on to a truck which took us to the school. This is where the yelling started! After being checked off the roll, we were marched/directed to the QM stores where we were issued all our personnel clothing and bedding (including a mattress). I remember the problems of trying to carry all this stuff while someone was yelling at us to keep in step. I must have made my bed 100 times (at least), because I did not get it tight enough to bounce a quarter on the top."

After twenty weeks of basic military training with the usual emphasis on disciplinary subjects of

19. Marr, Capt S.; *McNaughton Building*; EME Journal, Winter 1990.
20. This painting had earlier hung at the RCEME School.
21. Clarke, Capt R.; *On the Road Again*; published in *Quadrant*, bi-annual publication of the Royal Regiment of Canadian Artillery, Vol 12, number 1, June 1995.
22. Leflar, Col L.A.; unpublished notes, 1983.
23. Montague, MWO D.E.; *The Apprentice Training Plan*; notes, 1995.

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dress, drill, bearing and leadership, the apprentice passed out. The focus of training then shifted to academics. The regimentation of this period never really let up and was considered to be character-building. The effect was to produce a tightly-bonded group of soldiers. "To this day there dwells in each ex-apprentice a certain unspoken kinship whenever they meet" noted Master Warrant Officer Montague. Perhaps more importantly, their abilities and loyalty to the Corps and Branch have been an invaluable asset.

The apprentices were called the "Green Monsters," a nickname which came from the green flashes they wore to distinguish them as Craftsmen-Apprentices. However, the combination of platoon commander's, company commander's and CO's parades held over the entire training period turned them into sharp soldiers. The Governor-General of Canada, the Right Honourable Vincent Massey, came to Kingston in early 1957 to open the new hospital at Kingston. For that occasion the Craftsmen-Apprentices provided the honour guard.[24] In 1966 the Apprentices paraded with the Fort Henry Guard and the US Marines.[23] Drill teams and the RCEME School Band also benefited greatly.

Academically, the aim of apprentice training was to give the candidate a two grade increase in his formal education, up from a minimum of Grade 8 (later Grade 9) Ontario equivalent. The classroom facilities were a challenge to instructors and students alike and comprised a renovated World War Two H-hut with simple desks, blackboards and makeshift laboratory equipment. However, there was nothing makeshift about the instruction, and those involved with this part of apprentice training were as serious as their counterparts on the parade square. Mr P. Edwards, Senior Academic Instructor, stated in his 1959 academic report, "The odds are against anyone becoming a good technician who has a poor academic background. A good technician is more than a changer of spare parts; a good technician should be able to diagnose causes of failure and be able to recommend modifications to prevent further failure. To do this, the technician must understand the principles underlying his trade; this is the so called academic field."[25]

Although the courses taught were recognized both by the army and the Ontario Department of Education, those who wished formal recognition of their academic efforts in the form of a Secondary Education certificate required some night school work (two nights a week). Many did so and a number even obtained post-graduate degrees while remaining in the army.

Trades training commenced in the first year, and was the major focus of the second year of the apprentice program. The courses offered were the same basic trades courses offered regular recruits at the time.[23] As there were more training days available than normally required to produce a Group 1 Craftsman, the apprentices had the advantage of additional depth and breadth of trades training. This meant that there was plenty of time to grasp both the theory and practical sides of each trade, and most apprentices took full advantage of this opportunity.

Through all aspects of his training, whether regimental, scholastic or related to his future trade, the apprentice was highly competitive. In general, this was both encouraged and demanded by the staff as a means of getting the best out of these young men. However, the annual sports competitions among RCOC, RCSigs, RCASC, and RCEME apprentices had a tendency to get out of hand, as these "apprentice jamborees" often turned into showdowns. Notwithstanding the many stories surrounding these events which have grown to almost legendary proportion, the harried staffs somehow managed to contain the near-riots that seemed to conclude every jamboree!

At the end of their graduation parades - their green flashes were ceremonially removed by the inspecting officer and RSM - they were Craftsmen and no longer Craftsmen-Apprentices. As former Craftsmen-Apprentice (later Chief Warrant Officer) G.L. Johnson recalled, "The green flash was removed and, in a show of bravado, tossed to the wind, but I still have a set, as I know do many others."[24] The knowledge gained and strong esprit de corps developed as apprentices has stood the Canadian Army in good stead for many years.

Was the apprentice training plan a success? If you ask any of the members still serving, concludes Colonel Leflar, you would receive an unqualified "yes". "Out of the 1,010 members enrolled between October 1952 to June 1968, 696 graduated as regular soldiers. For thirty years, the ex-apprentices formed the major group of Warrant Officers and Senior NCOs in the Branch and have contributed 26 officers to the Branch."[22]

24. Johnson, CWO G.L.; *The Perspective of a RCEME Soldier Apprentice*; unpublished article, 1993.
25. *Apprentice Yearbook 1959*; privately published at the RCEME School, 1959, page 64.

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EME at RMC.

EME has had a continuing presence at the Royal Military College (RMC) Kingston. When RMC was reopened after World War Two, Major A.L. Maclean was appointed head of the Mechanical Engineering Department. Another RCEME officer, Lieutenant-Colonel P.C. King was a long-time head of this department. There have usually been two or more serving EME officers on the instructional staff, mainly in the mechanical engineering department, but also occasionally in the chemical engineering and mathematics departments.[26] These include Captain A.C. Leonard, who also became dean of engineering.

While at the college as instructors or as post graduate students, many EME officers have been exposed to such projects as cold starting problems in M113 APCs, application of infinitely variable transmissions to military equipment, and application of modern reliability theory to military industrial engineering and equipment maintainability problems. Several EME officers have served as director of administration, including Lieutenant-Colonels F.A. Hlohovsky, P.J. Holt and J.A.G. Langlois.

In 1995 a new course, the Land Force Technical Staff Course (LFTSC), was started at RMC. This course replaced the technical staff course given at the Royal Military College of Science in Shrivenham, England. The new course operates as part of the engineering division of RMC, involves the Canadian defence industry, and is attuned to Canadian operations such as peacekeeping. Half of the students are officers from the combat arms and half from the engineering branches. The original directing staff of the LFTSC included Lieutenant-Colonel J.E. Morrison, who helped set up the course and was responsible for the vehicle and mobility module.[26]

Liaison and Exchanges

Many EME officers and technicians have been involved in liaison and exchange duties. Often there is a large return for the small investment involved in these postings. Major G.A. Walsh, the Canadian Liaison Officer at the US Army, Tank and Automotive Command (TACOM) in Detroit during 1978-81, was able to save the Canadian Forces a considerable amount of time and effort in upgrading the M113 fleet by arranging for DND engineers and technicians to observe details of the US Army's upgrading program.

Major R. Stewart, who was on exchange at US Army's Test and Evaluation Command in Aberdeen Proving Ground from 1987 to 1990, was awarded the US Meritorious Service Medal for contributing significantly to the research, test and evaluation efforts of both the United States and Canada.[27] In 1989-90, Major P.G.G. Collinge was on exchange with Headquarters 1st French Corps. A year later he was transferred to 1 Commandement de Logistique Operationnelle where he participated actively in logistics operations exercises. For his work he was awarded the médaille d'argent de la défense nationale, a rare honour seldom granted to foreign officers.[28]

Exchanges between EME and REME have a long history and have taken many forms. Exercise Maple Exchange in February-March 1994 is one example. This two-week exercise was a visit by 55 Craftsmen from 1 Battalion REME to Maintenance Company, 1 Service Battalion. The program of events included winter survival techniques and familiarization with each other's equipment and working methods.[29] Later the Canadians visited REME units in BAOR.

The exchange of officers for duty in the other's corps is a long standing tradition between EME and REME. In 1994-95 two REME majors served in Canada, one at the EME School and the other in DGLEM. At the same time two EME majors served in the UK, one the REME School at Bordon and the other in BAOR with 3 Battalion REME. In addition four EME lieutenants served with BAOR units.

The exchange between the School of Electrical and Mechanical Engineering (SEME) Bordon, UK and CFSEME at CFB Borden has led to a very useful cross fertilization of ideas. The creation of LORE common training at CFSAOE was greatly assisted by the input of Major L. Short, the REME exchange officer in 1975-78. At the same time Major P.A. Vlossak participated in a complete review and redesign of career courses at SEME.[30]

26. Morrison, LCol J.E.; Background notes on the Land Force Technical Staff Course; 1995.
27. *Meritorious Service Medal (US) to Maj R. Stewart*; EME Journal Summer 91.
28. *Presentation of a French Decoration to Major P.G.G. Collinge*; EME Journal, Summer 1992.
29. Hancock, Lt J.L.; *1 Battalion Visit Canada*; The Craftsman Vol50 #8, August 1994.
30. LORE Technical Bulletin 3/78, page 36.

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In addition, up to three young EME officers are assigned to BAOR where they fill junior positions in workshops and LADs. At the time of the Gulf War, the three officers on exchange with REME units in BAOR went with their units to the Gulf and were subsequently awarded the British Gulf Medal. Lieutenants C.E. Woudstra and J.K. Dover - who were on exchange in 1992-4 - noted, "We learned a new vocabulary, different systems, and different equipment, but came back enriched and of better value to the Canadian Army."[31,32]

The difficulties of life in Moscow and Peking also extended to things mechanical. Consequently, in their search for the best type of technicians for embassy vehicles in these two capitals, Department of External Affairs officials called on DND for assistance. As a result, EME vehicle technicians often served in these embassies. In addition to vehicle fleets comprising European, Japanese and Russian cars, they maintained home appliances, projectors, air conditioners and anything else of a mechanical nature - including swimming pools - as well as supervising carpentry, plumbing and electrical repairs.

The position of military attaché is another way of being posted to embassies in such places as Prague, Istanbul and Oslo. The work of a military attaché is high-profile, requiring diplomacy and that side of EME not often demonstrated - a capability to be both a technical and a military professional. As such, it typifies "behind the scenes" activities in preparing EME personnel for their main task - keeping operationally fit the land equipment of the Canadian Forces.

31. Woudstra, Lt C.E.; *A Canadian View of an Armoured Workshop*; The Craftsman - the magazine of the REME Association; Volume 48, Number 7, July 1992.
32. Dover, Capt J.K. and Woudstra, Capt C.E.; interview with the author, 1995.

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17

Chapter 17 - RESERVES and CADETS

Background

The history of the Canadian Militia, of which today's maintenance companies and sections in the Militia Service Battalions are a part, goes back nearly four hundred years to the early French settlements in the St. Lawrence Valley and Acadia. The key concept was universal service. The Militia played an important part in most of the battles and skirmishes and, in addition, served Canada well as a means of mustering citizens to arms quickly.[1,2]

Regular troops have always been essential in providing military security for Canada. Before 1871 most of them came from Europe. As a consequence of the Crimean War, the British garrisons in Canada were drastically reduced, and Canada became more responsible for her own defence. The Militia Act of 1855 provided for a new and separate force of reservists called Volunteers who, even during peacetime, were uniformed, armed, paid, and trained. This force (not to exceed 5,000) is the forerunner of today's Militia.

The last British garrison troops left Canada in 1871. The Militia Acts of 1871 and 1883 authorized troops (not exceeding 750) for continuous service. This was the origin of today's Regular Force.

The Canadian Forces Reorganization Act of 1 February 1968 combined the three former services. The Land Reserve was still referred to as the Militia and was assigned to Mobile Command (FMC).

The Total Force Concept was introduced in the early 1990s to bring the reserves and the regulars under the same command structure. Mobile Command became Land Forces Command (LFC) with four areas - Atlantic, Secteur de l'Est, Central and Western - each comprising a number of units, some regular, some reserve and some a mixture (nominally 10% regular and 90% reserve). Regulars posted in to assist reserve units or headquarters were posted directly to units. Thus reservists began working for regulars and vice versa. The plan was to increase the regular force presence in militia units in order to better assist in administration and training planning.In 1995 the EME Militia had a strength of approximately 100 officers and 1,250 NCMs.

Organization and Role

The Canadian Stores Department was founded 1 July 1903 (see page 6). Its name was changed to the Canadian Ordnance Corps on 2 December 1907. On 1 April 1912, the NPAM component of the Corps was organized with headquarters in Ottawa and three detachments; 1 Detachment located in London, 2 Detachment located in Toronto, and 3 Detachment located in Kingston. Before the outbreak of World War One, eight additional detachments were created.[3]

Reorganization of the reserve - by then called the Non-Permanent Active Militia (NPAM) - took effect on 15 December 1936 and included Ordnance Detachments ((RCOC) NPAM). The establishment of some of these Reserve detachments included an Army Field Workshop (RCOC) or a Cavalry Division Workshop (RCOC). Our EME Militia maintenance units of today can trace their origins back to these workshops.

The reorganized Militia included six infantry divisions and one cavalry division. To support these infantry divisions, a number of Army Field Workshops were authorized: 1 in London, 2 in Toronto, 3 in Montréal, 4 in Halifax, 5 in Esquimalt and 6 in Calgary. 1 Cavalry Division Workshop was authorized for Winnipeg, but never formed.[4] This reorganized Militia also included 1 Ordnance Workshop Company at

1. Watling, Capt A.R.; *Canada's Militia*; Mobile Command Newsletter, January 1971; pages 25-27.
2. Stacey, Col C.P., (editor); *The Development of the Canadian Army*; Introduction to Military History, 6th edition, 3rd revision; pages 1-42.
3. Hodgson, LCol RA; *The Corps of RCEME - a History to 1 Oct 1946*; 1963; pages 398-401.
4. Defence Forces List (Nov 39), page 523.

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Kingston and 1 Anti-Aircraft Group Workshop at Montréal. In addition, three fortress workshops were authorized for Saint John, Québec, and Halifax but were never formed. By 1939 the workshop at Esquimalt had been reformed into 1 RCOC Fortress Workshop.[3]

On mobilization in 1939, many of these units provided volunteers quickly; so much so that the divisional workshops of the first four divisions in the Canadian Active Service Force (CASF) took their names from the Toronto, London, Kingston and Montréal workshops respectively (e.g. 2 Army Field Workshop (RCOC) NPAM of Toronto became 2 Army Field Workshop (RCOC) CASF of 1st Canadian Division (see also page 25).

By 1948, the organization of the RCEME Reserve Force (RCEME(RF)) reflected World War Two organization and thought. There were 61 RCEME(RF) units[5] in 31 locations (see Appendix 2). Some of these units were the successors of original RCOC (NPAM) units and/or are perpetuated in today's Militia Service Battalions.

The formation of these RCEME(RF) units depended on one or more of the following reasons: historic parent unit location, proximity of other RCEME(RF) or regular units, availability of civilian tradesmen and availability of accommodation. Another factor in the organization was that, at that time, military planning assumed standardization among British Commonwealth armies. This meant that units had to be organized in sizes, types, designations and establishments similar to those in REME, so that they could operate as part of a contingent to a Commonwealth force.

By 1950, it had become evident that tradesmen should be pooled from the localities where they were most readily available as civilian tradesmen. This would permit the rapid organization and buildup of the RCEME field force units within the limited time available on mobilization. Therefore the RCEME(RF) was completely reorganized into eight technical regiments and twenty-one technical squadrons.[6] Each regiment had two or more squadrons. The establishment of all units was built on the building block principle. The basic blocks were troops: weapons, stores, recovery, electrical, instrument, etc., consisting only of personnel of related trades. For example, each telecommunication troop consisted of one officer and 24 tradesmen, all of whom were telecom, radar, radio or line mechanics. Trade troops were grouped in any number to form units. The troops selected for any one unit depended upon locality and availability of civilian tradesmen and/or the local industry, e.g. electrical in Peterborough, vehicle in Oshawa, etc. This concept gave great flexibility to establishment and manning depending on local conditions.

Reducing the number of units to twenty-nine made important savings in accommodation requirements. With the larger units, there would be greater depth, an increased range of training and a better opportunity for employing tradesmen according to their technical ability. The larger units would be able to fit more easily into the established industrial pattern and more easily support the civilian community. The plan was presented to the Canadian Industrial Preparedness Association for advice and cooperation.

The reorganization of the RCEME(RF) in 1950 made allowances for the types of trades and industry in certain localities - GMC in Oshawa, CGE in Peterborough, heavy industry in Montréal. With the advent of National Survival in 1962, many skills not essential to survival operations became redundant, e.g., weapons and instruments. Emphasis in militia training was placed on the production of disciplined soldiers who could use their personal weapons and carry out the primary role of their corps in survival operations. In the case of the RCEME(RF), this amounted to vehicle repair, welding and recovery. In order to achieve this, establishments were revised. Technical regiments would have 800 all ranks, while independent technical squadrons would have 300 all ranks.[7] Each squadron had a recovery troop, vehicle troop, and welding troop, plus administrative and training elements. The total establishment of the RCEME(M) was some 6,000 - five regiments and eighteen technical squadrons. (By then the RF had been renamed the Militia (M) and RCEME(RF) had become the RCEME(M).)

In 1964, with the change in role to supporting the regular force, the establishment of the technical squadrons was changed again to more general, smaller units - 80 all ranks.[8] There were three platoons: vehicle comprising welding, vehicle repair and recovery sections; ancillary comprising electrical, radio/radiac, instrument, weapons and machinery sections; and a regimental platoon. RCEME(M) was now established for

5. RCEME Quarterly 1/1, page 12.
6. RCEME Quarterly 2/3, page 22.
7. RCEME Technical Bulletin 7/3, page 13.
8. RCEME Technical Bulletin 10/2, page 17.

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20 technical squadrons for a total of some 1,600 all ranks. These squadrons functioned as sub-units of newly-created militia service battalions, which took the name of the city in which they were located, or functioned as independent technical squadrons and retained their former numerical designations. Fifteen of the sixteen service battalions had technical squadrons. In addition, there were five independent squadrons in cities not located near service battalions, e.g. Sault Ste Marie, Arvida and St. Catherines. Four of the service battalions' first commanding officers were RCEME(M) officers, Lieutenant-Colonels J.R.M. McKay in Vancouver, A.A. MacIsaac in Hamilton, H.S. Caldwell in No. 1 Montréal, and A.N. Manson in No. 2 Montréal. In addition, within a year, No. 1 Toronto Service Battalion was also commanded by a RCEME(M) officer, Lieutenant-Colonel D. MacDonald.

In the armed forces reduction of 1970 the whole of the RCEME(M) was initially deleted from the Militia ORBAT. Aided by the Herculean efforts of the RCEME Association (see page 324) the ORBAT was amended to keep eight technical squadrons in being.[9] This reduced ORBAT, however, excluded Montréal which had an active unit, 43 Technical Squadron. Through the efforts of the commanding officer at the time, Major J. Ghanime, and aided by the Montréal Chapter of the RCEME Association, the squadron remained active. Today it functions as the maintenance company of 51 (Montréal) Service Battalion.

In recent years, militia service battalions have adopted organization and procedures similar to those of regular service battalions. Militia service battalions have been "affiliated" with regular force service battalions and numbers added to the city designators to reflect this affiliation e.g. 15 (Edmonton) Service Battalion is affiliated with 1 Service Battalion as is 12 (Vancouver) Service Battalion. The names of the maintenance sub-units of these battalions have been changed from the former numbered technical squadrons to maintenance company/platoon/section.

In 1975, ten militia service battalions had maintenance sub-units.[10] By 1982, all militia service battalions had maintenance components as ad-hoc sections or as formed maintenance companies. In the 1990s, particularly after the introduction of Total Force, some militia combat units also included EME personnel formed in maintenance sections with unit repair responsibilities.

The total force army is a blend of regular and reserve soldiers working together towards the accomplishment of the same mission. The transformation of the reserve service battalions is based on meeting the basic service battalion needs to provision of a quality and capability of service comparable to a regular force service battalion. Under MITCP 85, the reservist was expected to learn the full scope of regular force trade, but only in such depth as was possible in the available time. The new integrated training standards now require that the reservist display the same degree of knowledge and ability, but the number of tasks required has been reduced. The key element for the future success of Total Force, and thus the army, is the development of soldiers capable of being employed in a range of activities from garrison to operations.[11]

Regular Force Support

Regular Force support to the militia has included local training and administrative support to units, provision of maintenance training at summer camps and maintenance of militia equipment.

Local unit support was provided by special staffs. Initially called Administration and Training Staff (A & T Staff), the name was changed in 1951 to Instruction and Administration Cadre (I & A Cadre) and in 1968 to Regular Support Staff (RSS). The duties included provision of assistance in preparing administrative and training plans and supervision of instruction.[12]

Over the years many regular force EME technicians have been, and still are, attached to militia maintenance units. In the early 1950s each command headquarters had a RCEME officer and artificer to provide coordination of RCEME matters and to organize and conduct RCEME training at summer camps. These latter functions are currently performed by affiliated maintenance companies of regular force service battalions.

The maintenance of militia equipment at local unit armouries was provided by Reserve Force Servicing Sections (RFSS) - changed to Militia Servicing Sections (MSS) in 1968 to coincide with the name change in the reserves. These sections were part of regular force RCEME companies. The geographic spread

9. RCEME Technical Bulletin 15/1, page 25.
10. Minutes of the LOREA AGM 1975, pages 11-30.
11. Horne, Capt G; *Total Force Training: the New EME Reserves*; EME Journal 3/94, page 5.
12. RCEME Quarterly 4/1, page 47.

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was sometimes very large and often the MSS personnel were posted to locations far from their parent company headquarters. For example, the MSS at Thunder Bay is part of EME Squadron 17 Wing located in Winnipeg. It supports units from Lake of the Woods through to Thunder Bay, a span of 200 miles being supported from 200 miles away! The MSS carries a small stock of parts and in some cases carries out second line repairs either themselves or on local contract. The backloading of a vehicle from Dryden to Winnipeg, for example, is costly and very inconvenient.

The RFSS worked out of their trucks as they moved about from unit to unit. In order to improve efficiency, some sections had specially designed vehicles. The RFSS from 4 Company RCEME had a vehicle specially designed by Lieutenant W.G. Svab for units without mechanics or workshop accommodation.[13] The design, based on a standard 3-ton commercial truck, catered for servicing and first-line repairs. It carried 45 gallons of engine oil and 100 pounds of grease. Its equipment included an air compressor, oxy-acetylene welding equipment, a spark plug cleaner, grease gun, floor jacks, wheel alignment gear, and the mechanics' tool boxes. A range of spare parts was also carried. The design included insulation so that it could be used in winter. The MSS servicing trailers issued in 1981 were the successors to this special vehicle.

The responsibility for technical inspections also rested with the RCEME companies. Special teams would be made up from workshops and sent to units to inspect all equipment. In this way items such as weapons, radios, and sights not serviced by the MSS could be maintained. The inspection teams carried out minor repairs as part of their inspections.

Under the Base concept, each militia unit receives its support from a designated base. In large urban areas, with large concentrations of militia units, bases like CFB Toronto have MSSs located at armouries. These sections, which are part of the base maintenance sections or EME squadrons, often make use of militia tradesmen from the maintenance companies of the militia service battalions. This idea is part of the first step of a four phase plan which would see the militia maintain its own equipment and MSSs disbanded. The first step is first-line maintenance at maintenance companies of militia service battalion equipment. The second step extends this to all militia equipment. The third step adds second-line maintenance to militia service battalion equipment. The fourth step includes all militia equipment. This plan is currently well advanced in some militia maintenance units.

When the militia units concentrated during the summer for their summer camps, they took their equipment with them. In addition, equipment pooled under command control was also taken. The militia had been initially given World War Two equipment in the 1940s and this equipment, by and large, was not replaced for many years. Hence the maintenance problem at summer camps was a sudden influx of old worn-out equipment for which parts became increasingly hard to obtain.

The responsibility for the maintenance of this equipment was given to the RCEME companies. Specially-constituted advanced workshop detachments (AWDs), later renamed forward repair platoons (FRPs), were made up of personnel from the company headquarters and workshops they controlled. In 1952, the eleven-man AWD at Camp Dundurn, comprising men from 10 Company (Winnipeg) and 12 Company (Regina), worked under the direction of the Camp EME, Lieutenant K.S. Parton, a reserve force officer who later joined the regular force. Their work for that summer was carried out in two phases. Before the concentration, the 200 vehicles of the reserve force pooled vehicles at Dundurn were inspected, lubricated and all minor repairs completed. During the concentration, nearly 1,200 vehicles passed through the AWD (each vehicle six times) for planned servicing and repairs. This work plan reduced the incidence of major breakdown during exercises from 50 to five and ensured that vehicles were still serviceable at the end of the camp.

In 1965, on returning to its former role of supporting the regular force, the militia reintroduced summer camps. The camp at Petawawa that year from 27 June through 10 July featured corps training for 25 armoured, artillery or infantry units. An 18-man FRP was made up comprising men from both 2 Field Workshop and 8 Company RCEME, under the command of Warrant Officer (Class 2) A.M. Kirkpatrick. During the two weeks of the camp they expended nearly 2,100 hours (60 hours per week per man) supporting SMP and SC vehicles, M4A2 tanks, generating sets, telephones, radios, etc. The FRP was located on the Mattawa Plain adjacent to the militia camp. The support of militia camps today follows the style of these special AWDs and FRPs. However, with today's concept of individual training at combat groups and

13. RCEME Quarterly 3/4, page 42.

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the current policy of combining all maintenance into one unit, the support may be a little less obvious and more formalized. However, the basic principles in these early methods of supporting militia camps still are applicable, i.e. service tailored to the need at the customer's doorstep or tent lines!

As part of total force, most militia service battalions have a regular force officer posted in for training and administrative duties. Many of these officers are EME officers. In addition many EME technicians were posted to units to assist with training. For example, Sergeant R. Wright was posted to 15 (Edmonton) Service Battalion. He quickly became involved in planning and conducting recovery courses, introductory vehicle technician training and other courses as well as assisting the unit in its first line repair tasks. 32 (Moncton) Service Battalion saw the addition of a regular force corporal materials technician (441) in September 1995. With the addition of this well qualified technician, the platoon was able to extend the training opportunities and experience of its members.

A few regular force officers have been posted in to command militia service battalions. This was done on a case-by-case basis only when a suitable reservist was not available. For example, Lieutenant-Colonels B.F. Jeffery, J.A.G. Langlois and B.G. Wilson have commanded 36 (Newfoundland), 35 (Sydney) and 25 (Toronto) Service Battalions, respectively.

Tools, Parts and Facilities

When the RCEME(RF) units were first formed in the late 1940s, no precedent existed to guide their organization and operation. Initially, very little technical equipment was available and much of the accommodation was inadequate due to a shortage of workshop space and facilities. A 1951 survey by DME showed that the accommodation of 14 out of 26 units was unsatisfactory for this reason.

A two-story rented building, 30 by 60, was all that 25 Medium Workshop (later 33 Technical Squadron) of Sudbury had. The first floor was both garage and drill hall. On the second floor were offices, lecture rooms, and messes. All of the initial fitting up of the building was by self help. 37 Heavy Anti-Aircraft Workshop (later 28 Technical Squadron) of Peterborough only had one room as did 36 Heavy Anti-Aircraft Workshop (later 34 Technical Squadron) of Sault Ste Marie. 3 Technical Regiment was moved out of a temporary armoury in 1950 and for a while was without accommodation. However, 15 Infantry Workshop (later 8 Technical Regiment) of Vancouver was luckier than most. They were able to form a close association with 214 Workshop of the active force. Most of the early problems in technical training and recruiting stemmed from lack of adequate accommodation.

Improvements, however, were made during the early 1950s. CREME 2 Armoured Division and 4 Armoured Workshop (later 4 Technical Regiment) of Toronto moved into a new armoury on St Patrick Street. This, plus two other nearby buildings, gave them 15,000 square feet of floor space of which half was workshop space. Extensions to the Peterborough Armoury provided 28 Technical Squadron with 3,000 square feet of workshop space. 3 Technical Regiment of Montréal was moved into Belair Armouries, taking over from 226 Workshop of the Active Force. 34 Technical Squadron of Sault Ste Marie was fortunate when, in January 1952, Prime Minister St. Laurent opened a new armoury which included facilities for them.

Workshop machinery and tools were issued mainly in the form of World War Two workshop lorries and wreckers. These vehicles immediately gave the reserve units the opportunity to carry out trades training, to support other militia unit exercises and conduct field repair and recovery exercises on their own. The Reserve units used this opportunity in full measure. However, by the end of the 1950s these vehicles were worn out and parts were hard to find. Hence, the machinery and tools were moved into the armouries and the vehicles withdrawn. Until the issue of M62 wreckers in the 1960s, the RCEME(M) units were restricted to limited trades training. Eventually this equipment wore out too. It was not replaced and no scale of issue was drawn up.

By 1967 the problem of tools became acute for the RCEME(M). No scale of issue had been established or implemented. The annual meeting of the RCEME Association that year took note of this and a suitable resolution to DND brought quick action. A new scale was brought into effect the next year but, for various reasons, not all tools were issued. Furthermore, changes in role and organization rendered the scale of issue out of date. In addition, the problem of repair parts was not resolved.

At best only local arrangements could be made. These arrangements depended on the persuasiveness and enthusiasm of the militia units and the willingness of local regular force workshop officers to allow the militia to have an impressed stock and to carry out repairs.

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By the early 1970s, the LORE Militia unit commanders could see that a designated tasking, identified by a permissive scale of inspection and repair and backed up properly by a scale of tools and repair parts, was necessary for the continuing viability of the LORE Militia. Through the RCEME Association this was recommended to the Commander Mobile Command in 1971. Although the initial reply was not too optimistic, the situation improved because the close affiliation with regular force maintenance companies had started the LORE Militia on the way to maintaining the militia's equipment. The problem was finally resolved with the promulgation in 1978 of the "Permissive Repair Schedule for Militia." The extent of repairs undertaken and holdings of repair parts used to carry out repairs is dependent on the technical capability of the militia maintenance company concerned.

Most battalions continue to share the use of older facilities. Currently, 23 (Hamilton) Service Battalion is quartered in the facilities owned by HMCS Star and is co-located with the 23 Medical Company and Hamilton District Headquarters. The training area used by the battalion is CFB Borden. 32 (Moncton) Service Battalion has its maintenance platoon housed within a garage consisting of 1½ bays of working space, control office, tool crib, and weapons section working area. 21 (Windsor) Service Battalion facilities include a 3-bay garage located at its unit as well as a garage at the airport compound for vehicle storage.

A trend starting in the late 1980s was to include modern purpose-built facilities in armouries containing service battalions. An example is the Colonel N.C. Sherman Armouries, the home of 12 (Vancouver) Service Battalion. In February 1994, the Lieutenant-General E.C. Ashton Armoury opened in central Saanich to become the new home of 11 (Victoria) Service Battalion. The facilities included five vehicle repair bays, one training bay, two large servicing bays, a welding bay, battery shop, tool crib and an area for small engine repair. It was a far cry from their previous home in the squeezed facilities at the turn-of-the-century Bay Street Armoury where work space had been limited to three bays on the drill floor.

Local Activities and Training

Each year commencing in the autumn, militia units normally began their local training programs. Usually in September there was a recruiting drive, although January was another popular time as was Armed Forces Day in June. In many cases imaginative schemes were used to attract recruits. One year 38 Technical Squadron in Edmonton made a model of a typical workshop layout. Often there were mobile equipment displays in local shopping centres. 3 Technical Regiment of Montréal put on a jeep assembly display between periods at a Canadiens' hockey game in March 1952. This was followed up by several more demonstrations throughout the city the next week, culminating in an open house at their armoury on the weekend.

The RCEME reservist, like his active force brother, was a soldier and a tradesman. Therefore, unit training programs had to include such items as recruit courses, NCO qualification, rifle shooting, as well as vehicle mechanic courses and workshop layout. The mix was dictated by demand, facilities and trade skills of instructors. The most common trades training conducted was that of vehicle/recovery mechanic and welding, followed by machinist, weapons technician and radio repairman. Planning for trades training challenged unit commanders in three ways: interest, time and instruction. With only one night per week - occasionally two - and a few weekends, he could not plan a program to fully qualify his prospective tradesmen in their trades in a reasonable time. Retention of soldiers was dependent on keeping their interest, the ingredients of which were activity and promotion. As trades qualification was the key to promotion, the unit commander had to resort to a variety of activities to keep up interest.

RCEME Reserve units were built around veterans and skilled tradesmen who had the trades qualifications and who could easily pick up general military and corps training qualifications at local level in conjunction with other units, at summer camp or at the RCEME School. Lack of such people, however, soon began to hinder the development of LORE(M) units. Skilled tradesmen and professional engineers in sufficient numbers were not joining, creating a shortage of senior ranks and instructors and, as a result, only a limited cadre to train new recruits. In 1985, the Militia Individual Training and Career Profile 85 (MITCP 85) was introduced. It became the umbrella programme for all training in the militia, MITCP 85 with the mandate to train the militia to mobilization specifications. A limited number of sub-classifications and sub-occupations were soon developed.

Weekend exercises are the main means of keeping up interest and providing practical experience in trades and corps training. The variety of exercises is limitless but usually revolves around one of two themes:

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road movement supporting another unit or a unit weekend camp.

4 Technical Regiment of Toronto often formed an LAD to support Toronto-based artillery regiments as they moved to and from Meaford on weekend shoots. On one weekend, they accompanied 32 Medium Regiment RCA to Petawawa and back the next weekend. On these exercises running repairs on vehicles, wheel changes and bracket welding on guns were carried out. Repair parts were obtained on an improvised basis.

In later years, many maintenance units provided support for district weekend exercises. During 1973 the Vancouver Militia District exercise had over 400 participants. Running repairs and recovery for the thirty vehicles used in the exercise were provided by 49 Technical Squadron.

Unit weekend exercises are typified by 33 Technical Squadron's exercise in the autumn of 1952. It was a combined road movement, seventy miles over all types of road, for the twelve-vehicle convoy. The camp was tactically sited as a workshop. Once set up, running repairs to vehicles, recovery practice and driver training - including night driving - were carried out. There was also some rifle shooting.

However, exercises do not provide a full challenge and over the years, using the assistance of the RCEME/LORE Association, unit commanders sought to acquire more challenges to stimulate their soldiers. The introduction in June 1976 of FMC's Interim Provisional Maintenance Plan was the breakthrough for which maintenance units had long awaited. They needed a real purpose to challenge and interest their new young members. Maintenance Company of 25 (Toronto) Service Battalion, under Major S.J. Gill, studied the plan that summer and implemented the vehicles and weapons portions. They soon came to support their district with recovery and armourer services as well as the maintaining and inspecting of certain of their battalion vehicles. They also started on-job-training in these areas and were able to augment regular force weapons inspectors.

During the latter 1980s, through an initiative led by Major Gill, the EME Reserve School (EMERS) was set up at CFSEME. It operated during the summer and conducted advanced EME Reserve trades courses. Instructors from field units, often reserve units, were brought in to augment CFSEME staff. In the early 1990s it was gradually phased out as new standards of EME Militia training and qualification were introduced. EME reservists were to be trained to the same standard as regulars. Courses were designed in blocks. Reservists could qualify by completing the required blocks. Courses soon were a mix of regulars and reservists.

In 1995, new training challenges were established and new goals set for Service Battalions. As an example, many militia service battalions had to curtail or suspend trades training and activities until all personnel successfully met the combat readiness standard, called the Warrior Program. As another example, 12 (Vancouver) Service Battalion finished a two-year training program that focused on CSS Battle Task Standards.

The social side of unit activities has always been active. Centring mainly on change of command parades, annual parades and the Corps (now Branch) birthday, additional activities, such as toy repairing at Christmas, help band units together and foster camaraderie in the same way as exercises. In May, 1994, 11(Victoria) Service Battalion, in a combined effort with Base Esquimalt, CFB Comox, and 3 PPCLI, celebrated the EME Branch 50th anniversary with a combined parade reviewed by Colonel (Retired) B.L. Code, followed by an all ranks dance.

Summer Camps

Summer camps have been a long-standing tradition for the militia - with good reason. They offer a period of intensive training, usually with good weather, with proper equipment and facilities and good administrative and training support. RCEME Reserve units have participated no less enthusiastically than their fellow reserve units. These concentrations of units, personnel, equipment and support allow a higher level of training than that possible at home unit locations and offer an opportunity to practice the theoretical training conducted at home units during the winter and spring.

Over the years summer camps have offered general military training courses and special to Corps/Branch training and courses. One could qualify as a Senior NCO, take a rifle course, work on recovery or qualify as a captain. The manner of conducting camps changed over the years, varying in emphasis from individual, to unit, and currently, back to individual.

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In 1949, sixty RCEME(RF) personnel, representing all RCEME(RF) units in Alberta and British Columbia, attended the two-week Western Command summer camp at Camp Wainwright. The total camp attendance of all corps was nearly 800. The RCEME members were divided into two groups to practice workshop siting and movement or recovery. A contingency plan for inclement weather, which called for individual attachments to the active force AWD supporting the whole camp, was fortunately not required. In addition, all members saw demonstrations of or actually operated many types of tanks, trucks and guns. The motto of the training - "Nothing should be done in camp that can't be done at home in their own units" - ensured a successful summer for the attendees. Meanwhile, the 40 RCEME participants of the Prairie Command summer camp, which was conducted at Camp Dundurn, formed an AWD to support the camp. The AWD was sited tactically and carried out a full range of work using its workshop trucks brought from home units.

Prior to 1949 it was felt that the RCEME Reservists in Central Command were not ready to undertake Corps training. Therefore, those attending summer camp received infantry training. However, in the summer of 1949, Corps training for RCEME was started. It took the form of a one-week RCEME General Course. The course was prepared by Captain F. Coultish of the Command A & T Staff. The course was given six times that summer to a total of 40 reservists.

In 1951 the Corps training portion for RCEME of reserve force summer camps for Central Command was conducted at the RCEME School. The scope of training, however, was restricted somewhat because of the training commitment for 27 Canadian Infantry Brigade, which went to Germany that fall. However, by 1953 the idea had expanded and all RCEME reservists from Eastern, Central and Québec Commands went to Barriefield that summer. The training was done as units rather than as individuals and was given by unit officers and NCOs. The plan worked well as there was good attendance and a good balance of officers, NCOs and men. With attendance totalling 350, fourteen units spent a week at camp organized into three shifts of four or five units. Each week all personnel were formed into the reserve force infantry workshop, using the equipment and vehicles of the active force training workshop located there that summer. Workshop operation, deployment and siting were practised all week.

By the mid-1960s units were once again attending Command summer camps. 21 Technical Squadron's activities in the summer of 1962 provide a good picture. Six members attended qualification courses at Aldershot, and four were called out to work with the regular force. The main body of 30 attended the militia concentration at Camp Gagetown. Ten recruits participated in the recruit course while the remaining 20 worked with the regular force AWD and/or received specialist trades training in welding, recovery or machine shop. In addition, they participated in some National Survival training.

During the 1970s the emphasis had again shifted to the individual. Individual qualification courses and attachments to regular force maintenance companies were the methods of training at summer camps. However, some maintenance companies, such as 25 (Toronto) Service Battalion's, supported their district's vehicles at summer camp. At Borden, during the one week camp in August 1976, these maintenance companies provided repair and recovery services to their district's vehicles. They processed over 100 work orders from their field workshop.

In 1982 the Ottawa and North Bay service battalions joined forces to form a Mattawa Service Battalion to support the Ottawa and Northern Ontario Districts' joint militia concentration in Petawawa. The Mattawa Maintenance Company comprised militia maintainers from both service battalions as well as the MSS trailer and a vehicle technician, Master-Corporal Primeau, from CFB North Bay and the RSS vehicle technician, Sergeant Roberts, from Maintenance Company 26 (North Bay) Service Battalion. The company was able to carry out 160 repairs during the two week camp. More importantly, the twenty militia craftsmen received valuable experience and training.

National Competitions

As an incentive to improved performance and high maintenance standards, national competitions have been conducted among RCEME(M) units since 1953. Aware that one of its roles was assistance to the Reserve Force, the RCEME Association discussed during the early '50s ways and means of best carrying out this role. Consequently, a program of sponsoring inter-unit competitions was initiated in 1953. This program was very successful and continues today although the format and types of competitions have changed to

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meet changing circumstances.

Initially the program called for a number of competitions; rifle, summer camp, etc. For each competition there was a large engraved trophy for the national winner, cups for each of the five command winners and, in the case of the rifle competition, crests for the individual high-scorers in each command. (The command competitions were withdrawn in 1967.) Prizes were usually awarded during auspicious occasions, annual inspections, visiting dignitaries, etc. For example, Major-General H.D. Graham, GOC Central Command, presented the first RCEME trophy - the Summer Camp trophy - to 33 Technical Squadron, Sudbury, at a large public gathering well covered by the press. In thanking the RCEME Association for the interest it was taking in the reserve units by initiating the idea of competitions, General Graham commented that "the trophies were received with great enthusiasm." He foresaw the value, still valid today, of using inter-unit competition to develop good units. In winning fourteen national competitions, the most prolific winner of the RCEME(M) competitions was 21 Technical Squadron, Moncton.

The Rifle Trophy was started in 1953. It was awarded to the unit with the highest average score during annual classification. The Summer Camp Trophy was also started in 1953. It went to the unit with the highest percentage of attendance at summer camp. In 1957 two more competitions were added: the Junior NCO Trophy (awarded to the unit with the highest percentage of successful candidates attempting to be qualified as Junior NCOs) and the Tradesmen Trophy (awarded to the unit with the highest percentage of successful candidates attempting to be qualified as Group 1 tradesmen).

A competition for the best RCEME Reserve unit was initiated in 1967. The prize, the William Lennox Thompson Memorial Trophy, was awarded to the unit with the best overall performance (see Appendix 7).

In the early 1970s the identity of single service units and subunits gradually receded as service battalions developed. Consequently, the basis of competitions was revised in 1975 and all single service trophies were withdrawn. The revised system of competitions included a national award for the service battalion with the highest level of efficiency in maintenance. The prize continued to be the William Lennox Thompson Memorial Trophy. The five-time winner of this trophy was 45 Technical Squadron RCEME (later Maintenance Company 25 (Toronto) Service Battalion).

In 1990 service battalion competitions were discontinued. The last winner was 14 (Calgary) Service Battalion. The William Lennox Thompson Memorial Trophy is now at the EME Museum in CFB Borden.

Emergencies and Community Service

The idea of community support is embedded deeply in the tradition and rationale of the militia. Whether it be assistance in an emergency or community service, the RCEME Reserve units have always kept this in mind. Consequently, over the years they have amassed a proud record. The operations or activities which they have conducted or assisted in have run the gamut from submarine repair and flood patrols to mending toys for Christmas and providing trades training to young citizens.

In May 1950, the rising flood waters on the Red and Assiniboine Rivers threatened to close St. Boniface Hospital. Lieutenant-Colonel B.H. Miller, CREME 6 Armoured Division Winnipeg, was given command of Operation REDRAMP to keep the hospital open. The operation was successful. The main work was sandbagging and dike patrol. All of the reserves, army, navy and air force, were called out and many citizens joined in. 6 Armoured Workshop provided 60 personnel who worked three weeks, sometimes for 18-hour shifts. In another instance in the spring of 1951, the highway between Sudbury and Vermillion River was blocked to depths of up to 3½ feet by flood waters. 33 Technical Squadron, with its ¾-ton trucks, however, was called upon to make deliveries between the towns. As a further demonstration of potential ability in event of floods, this same squadron in 1959 built a Bailey Bridge over the Onoping River near Levack, Ontario.

On 9 December 1950, an oil tanker truck went out of control, over turned and stopped three feet short of a 75-foot embankment. There was no suitable civilian recovery equipment available in the nearby town of Blairmore, B.C. so 1 Recovery Troop of 39 Technical Squadron located there was called upon to recover the truck. Using a heavy Mack wrecker, the job was done in an hour and a half. This action eliminated a potential fire hazard and avoided danger to the civilians, who had been attempting to do the job with inadequate equipment.

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As a centennial community project, 25 Technical Squadron, Arvida, constructed a sportsman's shelter atop Mount Valin, thirty miles from the city. Ten members of the unit built a 16 x 25 foot, 8 foot high, log shelter in two weeks. Opened in October 1967, it provides shelter and comfort for persons who hike and climb in the mountains. Operation "FIXIT," conducted every autumn by 2 Technical Squadron of Ottawa, was its way of helping the community as unit members became toy-makers and provided much joy for Ottawa's under-privileged children. 8 Technical Regiment of Vancouver helped the Red Cross in the same way.

During the May long weekend of 1971, a major recovery exercise took place involving three M62 recovery vehicles and the members of 560 Moncton Army Cadet Corps under the command of Major D.P. Sentell. Four staff officers and 75 cadets, with three 2½-ton vehicles driven by the 32 (Moncton) Service Battalion, were involved in a cadet training exercise that turned into a recovery exercise called Exercise No Duff Atlantic[14].

A 2½-ton vehicle had left the narrow roadway, struck a tree, and was left immobilized over a 60-degree inclined hillside. Within minutes, an M62 recovery vehicle with two trainee recovery teams was dispatched to winch the disabled vehicle onto the roadway and tow it back. While doing so, half the side of the narrow roadway gave way, sending both the M62 and the vehicle in tow tumbling 20 feet down the embankment with the M62 landing belly-up at the bottom of the ravine. As it was the holiday weekend, it was early in the morning before two more M62 recovery vehicles could be located and dispatched from CFB Gagetown. It took a highly-coordinated effort of both experienced and novice recovery personnel, regular and reserve, working as a team for eight hours to make the final rescue.

The trades training program of EME Reserve Militia units has provided over the years a continuing benefit to young citizens in many towns all across the country in such trades as welding, vehicle repair, machinist and radio repair. But in addition to trades, it has provided discipline, camaraderie and many examples of good citizenship - a truly useful community service.

Cadets

The focus of the cadet movement to-day is citizenship. The cadet corps across the country bring young Canadians together and, using a military framework, impart teamwork, health, physical fitness, leadership, responsibility and discipline. Each unit must have a sponsoring group, which is often a local Legion branch. Each unit must also have an affiliated Canadian Forces unit which provides resources such as accommodation, instructors and training material.

Quite often a cadet unit will use the badge of its affiliated unit or, in the case of service battalions, one of its badges. In that sense, nine cadet units are associated with the EME family. Eight use the EME badge including: 3036 (Sackville Lions) Cadet Corps, affiliated with 33 (Halifax) Service Battalion; 2846 (Ancienne-Lorette) Cadet Corps, affiliated with 55ième (Québec) Battalion du service; 1239 (Malbaie) Cadet Corps, also affiliated with 55ième (Québec) Battalion du Service; 2482 (Beauport) Cadet Corps, affiliated with 5ième Battalion du Service; 1944 (Creemore) Cadet Corps, affiliated with the Canadian Forces School of Electrical and Mechanical Engineering; 2733 (Sherwood Park) Cadet Corps, affiliated with 15 (Edmonton) Service Battalion; 2979 (High Level) Cadet Corps, affiliated with EME Workshop 18 Wing of Edmonton and; 1746 (Creston) Cadet Corps, affiliated with 1 Service Battalion of Calgary. The ninth unit, 2861 (Windsor) Cadet Corps, uses the RCEME badge. This unit was raised at the time of unification in 1968. It was given the RCEME badge as a means of ensuring that the RCEME badge was never completely taken out of service, a tradition it proudly maintains to this day.

3018 (LETE) Cadet Corps was affiliated with the Land Engineering and Test Establishment. When LETE was closed in 1994, this cadet unit became affiliated with 3 Field Squadron. A ceremony at the former LETE site, still used by the cadet unit, marked this change of affiliation. At that time under the supervision of the two colonels commandant concerned, the unit was rebadged from EME to Military Engineers. The EME badge forms an important part of the history of this cadet unit and its long association with the EME family. Both the LORE and EME badges will remain emblazoned on the unit's drum-major sash.

Other cadet corps have rebadged to EME on a change of affiliated unit. In 1985, for example, 1746 Creston Valley Cadet Corps was rebadged to EME from RCE when the affiliated unit changed from 17 Field

14. Sentell, Col D.P.; letter to the author 1995.

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Squadron RCE to 1 Service Battalion. The members of 3036 (Sackville Lions) Cadet Corps exchanged their Royal Canadian Army Cadet badge for an EME badge during a ceremony on 16 May 1994, under the supervision of Lieutenant-Colonel M.J. Walsh, the commanding officer of their affiliated unit. On 27 October 1995 Brigadier-General J.J.R. Marleau, the DGLEPM, presided over the rebadging of the 2482 (Beauport) Cadet Corps to EME at a ceremony in CFB Valcartier.

2733 (Sherwood Park) Cadet Corps was started in 1959 in Wainwright and moved to Edmonton in 1962 and rebadged to LORE in 1983. Its activities for 1995 included the Freedom of the City Parade for its sponsoring unit 15 (Edmonton) Service Battalion. The marching troops for the Liberation of Holland memorial parade and services on May 4th were six cadet corps of which 2733 Cadet Corps was one. The reviewing officer was the Lieutenant-Governor of Alberta. Having the cadets featured in this service was an excellent way of helping to ensure that the lessons of World War Two were passed on to new generations.

On 3 June 1995, 2979 (High Level) Cadet Corps held their annual inspection at a lake near town. The cadets set up displays of lean-to construction, compass use and campfire building. These activities reflect the corps' emphasis on outdoor activities and way of life in this northern town.

Many members of the Canadian Forces started their military careers as cadets. Often when looking at the past, present and future of the military we think of the cadets as the future. This was clearly demonstrated at the Freedom of the City ceremony in Kingston on 3 June 1994. The marching troops members included three groups; the RCEME Association represented the past, the EME Regulars and Reservists of the Canadian Forces represented the present, while 3018 (LETE) Cadet Corps and 2862 (Windsor) Cadet Corps represented the future. It was a proud moment for all.

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Chapter 18 - THE ASSOCIATIONS

The membership of a Branch Association is open to all serving or retired members of the Branch. Its objectives include promotion of the Branch, mutual support of its members and camaraderie. For the EME Branch there are several privately constituted associations, each of which covers some or all of these objectives. These include the EME Association, which was formed in 1945, and several other associations which were formed in the 1970s and early 1980s as an aftermath of Unification of the Canadian Forces.

The EME Association

Originally called the RCEME Association, the Association was formed in 1945. It has changed names four times as the Branch name has changed. It is now the EME Association. The first annual meeting was held in Toronto on 23 November 1946[1] and one has been held each year since. Originally all former and serving officers of the Corps are eligible for membership. The scope of membership was subsequently expanded to include community industrial leaders and civilian officers of the department performing duties similar to EME officers. The Association has always had a threefold purpose: assistance to regular and reserve EME units, advice to the Canadian government on defence matters, and mutual help and camaraderie among members.

The main method of providing advice and assistance has been through resolutions presented at the Conference of Defence Associations (CDA). The CDA, comprising representatives of all branch and service associations, is designed to provide the government with advice on defence matters from a group of dedicated and concerned citizens usually with much military experience. Such advice is derived from resolutions of its constituent associations. In the 1990s most of the matters raised in discussion in the Association have been of direct interest to the operation of EME units. Consequently most resolutions have been forwarded directly to Commander LFC and DGLEPM.

Over the years the Association has rendered sterling service to Canada through both the quantity and quality of resolutions on a wide scope of subjects not always restricted to technical matters. For example, on a national theme level in the mid-50s and 60s, the Association pioneered in recommending selective service, time off for training for reservists, and more recently, job protection legislation. As another example, noting the critical value of RCEME recovery capabilities during the time of National Survival Training in the late 50s and early 60s for all of the militia, the Association proposed in 1958 that the RCEME(M) continue to carry out the usual corps role and train for it. Although this was rejected at the time, the idea was ultimately adopted. These examples reflect the in-depth advice that the Association can provide for the country. This type of advice was reflected again in the 1974 resolution supporting the main battle tank, the result of which was the procurement of the Leopard Tank.[2] The Association was instrumental in initiating a militia recruiting pamphlet in the early 1960s and introduced resolutions designed to improve the public image of the militia.

The Association has also been a strong proponent of armouries with technical facilities for EME militia units. Several armouries, for example Sault Ste Marie, Vancouver, Victoria, Calgary and Ottawa, reflect the success of these efforts. Military museums, militia courses and professional pay for engineers are other topics which the Association has championed with a large degree of success.

Through its discussions and resolutions the Association has sought to help resolve language difficulties in the Forces. The notion of a French military dictionary was discussed at the 1963 meeting. It

1. Minutes of RCEMEA AGM 1964, p 1.
2. Minutes of LOREA AGM 1976, page 16.

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seems that an earlier dictionary, circa 1948, was no longer available and a replacement was necessary. In 1967 the Association proposed the issue of corps badges with the following inscription, "Corps Royal Canadien du Génie Electrique et Mécanique" The proposal came at a time of an overall CFHQ study. However, in view of the general informal acceptance of the idea, such badges were adopted locally by the three units concerned.[3] The request for instruction in French in 1968 for corps and trades training[4] provided a vigorous discussion in the general meeting of the CDA in January 1969. This was followed by the decision to have the reserves participate in the FRANCOTRAIN program which was initiated in February 1969.

The mid 1970s were a low point for the EME Militia and helping it has been a main focus of the Association's activities. Resolutions and briefings at the AGM, and closer rapport between chapters and units at the local level, have brought attention and assistance to the militia. There have been resolutions on permissive repair schedules, repair parts holdings, workshop accommodation, trades training courses etc. At the 1977 AGM there was a panel discussion on the LORE Militia. Since 1990 a feature of the Association's AGM has been a seminar on the EME Militia and Total Force. These seminars, which have been conducted by Colonel L.J. Leggat, have proved to be helpful in the understanding of the special problems of the militia - and the resolution of some. The resurgence of the LORE Militia in the past few years has been helped by the Association's efforts.

The Association has sponsored resolutions on approximately 100 different subjects, of which nearly half were accepted by the CDA and about a quarter were approved by NDHQ for implementation, an impressive record by a dedicated group of the nation's citizenry.

The original organization of the Association comprised a national executive with five regional chapters, each comprising one or more city groups. However, by the mid 60s the Association realized that this regional chapter system did not give enough voice to the militia units that it wanted to support. Therefore, COs of militia maintenance units were invited to take part in annual council meetings and to give reports at annual general meetings. This was very successful with usually about a dozen COs attending. By the early 1970s the regional chapters had disappeared. Currently, there are eleven chapters, the chairmen of which are members of the Association's National Council. A chapter must have at least ten members.

The National Council of the Association now includes the Senior Serving EME Officer of each militia service battalion. Often the COs of the battalions attend, and in several cases, although not EME officers, are members of the association. All battalions are invited to submit an annual report to the AGM, the minutes of which now give a good picture of maintenance unit activities in the militia service battalions.

Membership over the years has varied, reflecting initially a residual interest from the war. Membership was around 400 in the early 1950s. In 1984 it was 150. During 1994, the 50th Anniversary year, membership had increased to 300. A year later it was well in excess of that number, due mostly to the hard work of the chairman of the membership committee, Captain J.G. Wilkin.

Many of the Association's members have a record of long and faithful service to the country through active work in the Association. Of these perhaps the most outstanding is Lieutenant-Colonel Les Brodie who served 30 consecutive years as secretary-treasurer. During this time he also served a term as President of the Conference of Defence Associations. The weapons training building at the EME School in CFB Borden is named in his honour. In 1975 he was succeeded as treasurer by Lieutenant-Colonel A.R. Hilliard who (as of 1995) continues to faithfully serve the Association in that capacity.

The first president of the Association was Colonel H.G. (Spike) Thompson, who put his heart and soul into getting the Association started and who wrote the first constitution. Colonel Thompson had had a distinguished military career spanning two world wars. Active in the reserves in the late 1930's, he was the CO of 2 Army Field Workshop which was part of 1st Canadian Infantry Division sent to England in 1939 and was DME at War's end. The Thompson Drill Hall in CFB Kingston is named in his honour.

Colonel G.W. Thompson was the president when the Association's name was changed from RCEME to LORE at the annual meeting 3 November 1973. He was succeeded by Colonel K.D. Sheldrick, who worked tirelessly to expand the Association and to whom much credit is due for the upsurge of interest in the mid-1970s, in particular in making the Association relevant to the regular force officers of today. This upsurge continues today, thanks to the continual efforts of the president from 1977 to 1979, Lieutena-

3. Minutes of RCEMEA AGM 1968, page 14.
4. Minutes of RCEMEA AGM 1968, page 43 and Minutes of RCEMEA AGM 1969, page 16.

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nt-Colonel R.J. LaVigne, who sought to make the Association visible and necessary to the community as a whole.

Others who gave years of dedicated service to the Association include: Miss Dorothy McDonald, recording secretary for thirty years; Lieutenant-Colonel A.G. Edward and Lieutenant-Colonel J.K. Bradford, both long time national executive members; Captain W.L. Shelden, photographer for twenty-five years; Captain J.L. Miller and Lieutenant-Colonel G.L. Marrotte, remembrance committee chairmen for over twenty-five years; Major D.C. Ferguson, three times president and long-time active member on all aspects of the Association's activities; Colonel W.H. Bonus and Lieutenant-Colonel E.D. Gray-Donald, both national executive members who worked hard during the formative years of the Association; and Major N.A.G. Graham, a past-president and long time chairman of the finance committee. In recognition of their contributions to the Association Major Ferguson, Lieutenant-Colonel Marrotte and Major Graham were made honorary life members of the Association in respectively 1993, 1994 and 1995.

After the militia reduction of 1969, the RCEME militia was to be disbanded. The Association's executive, at that time led by Major Ferguson, intervened on short notice. They were able to muster arguments and support, enough to assure that the RCEME(M) would retain its place in the ORBAT of the reserves.[5] The wisdom of this effort is reflected today, a decade and a half later, in the maintenance sub-units of the militia service battalions. With the current requirement for back-up to the regulars, the need for militia maintainers is readily apparent. We benefit today as a result of their foresight in 1969.

The Association also supported the militia by providing a series of trophies for inter-unit national competition. These trophies have included prizes for rifle shooting, summer camp attendance and best tradesman. National Competitions were discontinued in the late 1980s. In the early 1990s the Association's prizes and awards committee headed by Major M.D. McKinley developed a series of awards for students and instructors of the summer militia training courses conducted at CFSEME as part of the EME Reserve School (EMERS). Later as 1995 drew to a close, plans were finalized for the Association's "Best Craftsman" Award for competition among Reserve EME corporals and privates at the national and regional levels.[6]

One of the great difficulties in the militia over the years has been that of attracting graduate engineers to become Reserve EME officers. The Association has a long record of innovative proposals to facilitate adequate training for such engineers in such a manner that they would want to join up. One resolution in 1956 proposed acceptance of graduate engineers as acting lieutenants after one year and one summer camp. Professional pay, advocated in the mid-50s, is another example.

Another valuable facet of the Association's efforts was the ladies' auxiliaries. These were particularly active during the time of the Korean conflict and concentrated on providing books and smokes for the troops in Korea, and visiting the sick and wounded as well as relatives and wives of regular force personnel in the camps. One group, the RCEME Women's Auxiliary in Petawawa, even lobbied for grocery stores and bank branches in camp!

The Association early realized that industry is a vital aspect of the nation's military effort. With this in mind, an industrial committee was formed with a view to forging links between industry and the military. One outcome of this idea was industrial sponsorship of several militia RCEME units, for example, Arvida and Peterborough. Another outcome was mutual discussions in Vancouver on industry-military problems.

Another aspect of the responsibilities of the Association is that of proffering professional counsel to the federal government in matters of national security and defence. By virtue of its membership, the Association has a large pool of essentially untapped talent capable of the strategic and technical thought required to carry out this responsibility. Consequently, the Association in recent years has focused considerable attention on this aspect. It has a corporate membership in the Canadian Institute of Strategic Studies. The proceedings of the Institute are reported annually at the AGM. Several resolutions on the subject of national unity have been presented to the CDA and widely discussed. In 1978 the Association's position paper, "Survival: Principles and Strategies for Broad Social and Economic Direction in Canada," was discussed at CDA and subsequently widely distributed to all levels of government.

Another valuable legacy of the RCEME Association is the Memorial Gates at McNaughton Barracks at CFB Kingston. This project commenced in 1961 at a cost of $3,700 which was contributed by members

5. Minutes of RCEMEA AGM 1970, pages 9-10.
6. *Best Craftsman Award*; unpublished LFC report, 1995.

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and former members of the regular force, the militia and the Association as a remembrance to members of the Corps who died in the service of their country. The gates were unveiled in October 1961 by General A.G.L. McNaughton, Honourary Colonel Commandant of the RCEME Corps. In 1964 the Association voted to extend the gates. This was done at a cost of $5,000. The gates, very much as they are today, were re-dedicated in 1967 by the then Commandant of the RCEME School, Colonel A.L. Maclean.

At the chapter level activities are varied and take on the character of local circumstances. Here is a glimpse of the chapters as they were in the mid-1990s. The New Brunswick chapter rotated its meetings around Moncton, Gagetown and Chatham. It brought EME regulars, reservists, and retirees together province-wide. The driving force behind this group has been Colonel D.P. Sentell, a former District Commander in New Brunswick. The Halifax chapter was active in many social and militia activities in the area. In Montréal the basis for the chapter is 202 Workshop Depot. Many of its suggestions and resolutions are aimed at ensuring this unit is able to function at it best.

The Kingston chapter focuses on supporting activities centred on the RCEME Gates. The Ottawa Chapter has several evening meetings throughout the year. Speakers cover engineering and general topics of interest to its membership of regulars, reservists and retired officers working in the defence, defence-related consulting and engineering sectors. The largest Chapter is the Toronto Chapter with 100 members. It draws its members from a wide area in souther Ontario and focuses on support for the School at Borden.

The Calgary and Edmonton areas have many retired officers as well as regulars and reservists. Each has a sizeable group based on a local militia service battalion, meets occasionally and has potential for becoming a chapter. The Vancouver chapter has an active group of retired officers and is closely associated with the local militia service battalion. In the early 1990s under the leadership of Captain F. Chess, the Victoria chapter established an EME museum in conjunction with the local militia service battalion.

All chapters were heavily involved in supporting the rebadging ceremonies in 1991 and the 50th Anniversary in 1994. Activities included preparing displays of EME history as Major F.G. Legg did in Victoria and attending parades including being the reviewing officer.

Over the years the fortunes of the Association have waxed and waned. The president's message in 1952 was one of combating lack of enthusiasm. By 1974 the message was one of increasing vigour and membership. The message in 1981 included the need for aggressive recruiting especially from engineers in industry. Underlying these messages, however, was a solid record of service to country. Many of the ideas noted here have shown what has been done, tried and are useful, ie, valuable information for today's soldier. Continual discussion of the problems of national defence is required to ensure that the nation is always prepared. The Association provides a valuable forum for this discussion.

As a result of its annual meeting during October 1970, the Association sent a resolution to the Prime Minister expressing concern for the well-being of Canada, deploring the brutal acts by a small minority, and giving full support of the action which had been taken by the government to achieve effective control and to safeguard the rights and lives of citizens. The Prime Minister was gratified with the moral support and quickly said so.[7] This support and action by the Association at a difficult time in our nation's history exemplifies the true spirit and value of the EME Association as an integral and vital part of the Armed Forces - and has been since 1946.

Other EME Family Associations

In addition, to the EME Association there are a number of privately incorporated RCEME/EME oriented groups which hold reunions and have as their primary aims fraternal comradeship and welfare of former comrades in arms. Each of these groups is independently organized and draws its members primarily from a region. The RCEME Association draws mainly from Central and Eastern Canada, The RCEME Association of Alberta from Alberta and the Prairies and The RCEME Club from the West Coast. A fourth but small group, The RCEME Prairie Vets is centred in Winnipeg.

In 1968 the system of "Branches" was taken into use in the unified Canadian Armed Forces replacing the system of Corps. Hence the Corps of Royal Canadian Electrical and Mechanical Engineers became the Land Ordnance Engineering Branch (LORE Branch). In the fall of 1973 the RCEME Association changed its name to LORE Association to match the Branch name and in 1975 the beloved

7. Minutes of RCEMEA AGM 1971, pages 11-12.

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"Horse" badge was replaced by a new LORE badge.

From a branch identity and moral point of view, this was a low point. However, the spirit of the Craftsman lived on. By the end of the 1970s, groups of RCEME veterans had begun to form associations devoted to maintaining that spirit.

The RCEME Club. The first such group to be formed was the RCEME Club which was formed on the west coast in 1974 under the leadership the Mr Ernie Wallace. (As of 1995 he retains that leadership.) Membership is about 170. The criterion for membership is to have worn the RCEME badge. Annual reunions, held on the last weekend in April, alternate between Vancouver and Victoria. The format usually includes a meet and greet on the Friday evening and cocktails and dinner on the Saturday. The attendance for the 1995 reunion, held in Vancouver, was nearly 70.

A highlight of the RCEME Club's activities occurred when it paid for and had made the RCEME badge that is on the Canadian Memorial Tank at Courscelles-sur-Mer, Normandy (see page 53).

The RCEME Association. The RCEME Association was incorporated in 1978.[8] It conducts annual reunions in Kingston. Originally the single criterion for membership was to have worn the RCEME badge. Later, circa 1985, this was expanded to include who had worn or were wearing the LORE or the EME badge.

During the later 1980s the Association set up chapters, i.e. LADs, in several locations. The Kingston group was designated 101LAD with special responsibility for operating the annual reunions. In 1994 there was a change in organization in the RCEME Association in order to reduce duplication of executives and levels of decision. 101LAD was disbanded per se. LADs now exist only in areas outside of Kingston.

The Association attracts large crowds, up to 800, to its annual reunions which are held during the first weekend in June in the Thompson Drill Hall in the site of the former RCEME School (see page 293). The format usually includes a meet and greet on the Friday evening, a business meeting on the Saturday afternoon and a dinner/dance with a guest speaker on the Saturday evening. The weekend concludes on the Sunday morning with a parade, a memorial service at the RCEME Gates, a march past with the guest speaker of the previous evening taking the salute, and finally breakfast.

Perhaps the highlight of the RCEME Association's activities was in originating the plans for securing the Freedom of the City of Kingston for the Corps of RCEME, its predecessors and its successors (see page 311). Mr. G. Turcotte worked long and hard on this project. His efforts were instrumental in ensuring that planning was successfully started.

The RCEME Association's ties with the EME family have become stronger over the years. For example, "Sadie's" now sells EME items from the Branch kit shop as well as specially produced "RCEME" and "RCEME Association" items. This is due in large part to the fact that many of its members are still in the service and now, more particularly, after the return of the Horse badge. During the planning for the EME 50th Anniversary, the president of the RCEME Association was a member of the Anniversary Steering Committee.

The RCEME Association of Alberta. The RCEME Association of Alberta was formed in 1981. The driving force behind its formation was Chief Warrant Officer (Retired) L.G.(Jimmy) George who realized the need in the Alberta area to perpetuate the spirit of RCEME. He campaigned long and hard to form a group along the same lines as the other two associations. The first meeting of the Association was held in the Warrant Officers' and Sergeants' Mess in Harvey Barracks.

The Association's membership is around 170. A typical year has three events, a barbeque in the fall, participation in the Xmas party of the maintenance company of 1 Service Battalion and an annual banquet on the weekend nearest May 1st. A highlight of the Association's activities occurred at the annual banquet in 1994. A special effort was made to involve regulars, reservists and retirees. 300 attended the function. Extensive displays of RCEME equipment and mementos encouraged veterans to pass on RCEME lore and stories to to-day's young craftsmen. The guest speaker was Brigadier-General (Retired) J.I. Hanson whose talk focused on the theme of the weekend - Pride in the Past, Faith in the Future.

It is a theme which typifies the branch's four associations and has made them full members of the EME family as ipso facto regimental associations.

8. At that time the name, The RCEME Association, was not in use.

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THE EME WAY

"By the way, my Corps is now RCEME, not RCOC. There's a difference. We are combatant troops. We are a young Corps but we are pretty proud of being RCEME. If I could tell you some of the jobs this outfit has done to give the boys up front an extra break, it would open your eyes," wrote Artificer-Staff-Sergeant M.C. Stone in late 1944 to his son in Canada.[9]

He knew the value of *esprit de corps* and how that was being helped by the formation of RCEME, which gave Canada's Craftsmen a separate identity - something they have cherished, clung to and fought for over the last 50 years.

MONTAGE, *previous page: clockwise from top left*: the EME 50th Anniversary Skill Demonstration Team between shows at CFB Edmonton. *DND*; competing in the EME 50th Anniversary -Skill at Arms competition; *DND*; raising the flag for the first time - 1976 at 202 Workshop Depot; *DND*; unvieling the EME 50th Anniversary Commemorative Monument. *DND*.

9. Stone, Artificer/Staff/Sergeant MC; letters to his son 1941-46.

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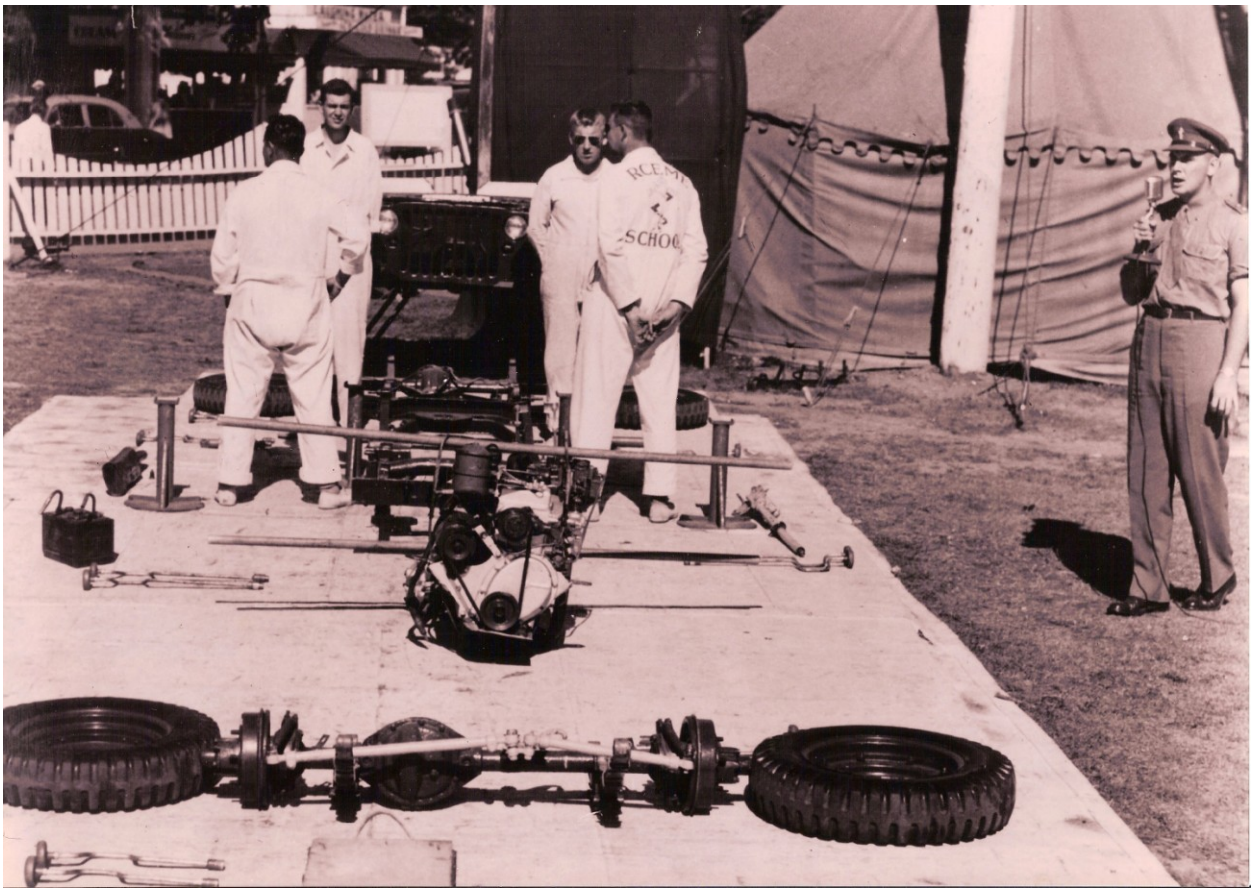

The RCEME Quick Assembly Team – 1952 - performing at the Canadian National Exhibition. *DND*.

The new EME badge - 1991; *left to right:* Colonel W. Svab, EME Colonel Commandant; Brigadier-General J.I. Hanson, EME Branch Advisor; Chief Warrant Officer R.E. Roy, EME Branch CWO. *DND*.

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Celebrating the EME Birthday - wherever we are. Captain F.A. Ouimet cuts the cake for RCEME Increment 1e Royal 22e Régiment - Cyprus 1965. *Capt F.A. Ouimet*

Craftsmen on Parade. During the 21st Anniversary of RCEME celebrations in Germany in 1965 4 Field Workshop drovepast under the command of Major P. Bateson with Captain N.A.G. Graham as 2IC and Sergeant J. Scarfe as marker. *DND.*

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Craftsmen and their mascots - *left:* The 48 LAD mascot and friends somewhere in England circa 1943-44 - attached to 10 Canadian Infantry Brigade of 4th Canadian Armoured Division they were in Normandy in the summer of 1944. *DND* Archives; *right:* Wrecker, mascot and compound guard of Maintenance Company Canadian Logistics Battalion, with Corporal ?? Reid. *CANLOGBAT*.

The RSM's cane being passed from the outgoing RSM of the School, Chief Warrant Officer M. Clough to the new RSM, Chief Warrant Officer T.P. Chaudar, under the watchful eye of the Commandant of the School, Lieutenant-Colonel D.W. Clarke, and the Parade reviewing offer, Colonel M.A.C. Campbell. *DND*.

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Chapter 19 - The EME IDENTITY

Getting an Identity - The Formation of RCEME, Keeping an Identity - Unification and LORE, Pride in an Identity - from LORE to EME and The Horse is Back! The EME Image - What makes us EMEs tick?

Getting an Identity - The Formation of RCEME

"There should be established in the (British) Army a Corps of Mechanical Engineers ...Until the Army gives to mechanical and electrical engineers ...their appropriate place and influence in the Army system ...there is a danger that they will be misused by men whose main interests and duties lie in other fields."[1]

The Precedent - REME

The crux of this recommendation from the Beveridge report of October 1941 lies in its clear implication that the formation of such a corps would not just be a temporary war-time expedient to ensure a better use of scarce resources, but was a principle that could only be settled by a permanent change of attitude.[2] Sir William Beveridge, at that time the Director of the London School of Economics, had been appointed to lead a committee to examine the use to which skilled men were being put. By its recommendation, the committee became instrumental in changing attitudes toward forming a new corps and eventually led to the formation of REME.

In the decade before World War Two, two committees had considered various options for reorganizing mechanical engineering services in light of the overlap in repair functions between corps in the army. Their ideas were galvanized into action at the outbreak of World War Two by two factors, inability to maintain equipment and misuse of skilled manpower.

After mobilization in 1939, the British Army was given an enormous quantity of powerful and complicated equipment which it was unprepared to maintain. By February 1940, the British Expeditionary Force in France was to all intents immobile. Workshops were overloaded and unable to achieve the output required. A special committee investigated and recommended what was, in effect, the basis of a system of four levels of repair and amalgamation of the different corps' base workshops. This recommendation was not actioned because of the loss of the Army's equipment at Dunkirk. However, it sowed the seeds of reorientation of electrical and mechanical equipment maintenance policy in the British Army.

Another result of mobilization of 1939 was the absorption of a large number of skilled and experienced men into the army. Many of them went to arms units which could not make use of their skills. The resulting repercussions on industry and on the technical corps of the army were serious. This was the problem facing the Beveridge Committee in 1941. By the time their initial survey was completed, action had been started to transfer some 50,000 skilled tradesmen back to industry and others to technical branches in the army.

However, the committee also recommended the formation of a new Corps of Mechanical Engineers. Aware of the problems of doing this in the middle of war, the army appointed the Sinclair-Weeks-Dunkly Committee to address the question of creating a separate maintenance corps.[3] Their report of February 1942 recommended "the transfer of the responsibilities for electrical and mechanical services covering the whole of the army's equipment ...to a new corps together with the personnel who were employed at this task."[4] At

1. Hodgson, LCol R.A.; *The Corps of RCEME - a History to 1 Oct 1946*; 1963, pages 371 and 394.
2. *Craftsmen of the Army*; Leo Cooper Ltd, London, 1970, page 150.
3. Hodgson op.cit. page 371.
4. Hodgson, op. cit., page 370.

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the same time artificers assigned to "owner/driver maintenance" would remain with their regiments and corps. This was styled phase 1 of the organization of the new corps.

The first names considered for the new corps were Corps of Engineering Maintenance and Royal Army Repair and Maintenance Corps - both considered too long and focusing on what members of the new corps were to do rather than who they were. Corps of Mechanical Engineers was next considered. Sir William then noted that this name would fail to give the new corps the right status of function. He suggested Corps of Mechanical and Electrical Engineers. This idea was accepted. Since the Institute of Electrical Engineers was senior to the Institute of Mechanical Engineers, Electrical preceded Mechanical. The King added his Royal Warrant and the new Corps became the Royal Electrical and Mechanical Engineers.[5]

The Army quickly adopted this recommendation. The Royal Warrant authorizing the formation of REME was granted on 19 May 1942 with effect from 1 October 1942. It noted that "all officers and other ranks of the Royal Electrical and Mechanical Engineers shall be combatant in the fullest sense."[4]

Thus in a single stroke of the pen, the craftsmen of the British Army won an effective organization in which to use their skills, identity for their group and the prestige of being soldiers as well as tradesmen. Canada's Craftsmen would win these too, but piecemeal and only after a long and oft-times acrimonious struggle which at one point reached the floor of the House of Commons.

Reorganization without Change

The events leading up to the formation of REME were followed closely by the Canadian Army. Committees at CMHQ and NDHQ were formed to give top-level opinions on the reorganization of the repair services in the British Army.

At a meeting at CMHQ on 13 May 1942, Lieutenant-General A.G.L. McNaughton, the Commander of the Canadian Army Overseas, pointed out the importance of keeping the Canadian organization as similar as possible to the British and, for operational reasons, keeping to a minimum the changes to be made.[6] The conference consequently recommended that no new corps be formed, but did not rule this out if the British experience was more advantageous. The conference also recommended the transfer of certain equipment maintenance responsibilities and personnel to the RCOC. These recommendations were approved and actioned in the summer of 1942.

On 11 January 1943 the Canadian Army Overseas implemented the REME system, but did not form a new corps. Canada's Craftsmen remained members of the RCOC. However, REME titles and establishments were adopted, e.g. OMEs became EMEs, a new appointment of Commander Royal Electrical and Mechanical Engineers (CREME) was authorized for formation troops, the very large divisional workshops were reorganized into smaller brigade workshops and LADS while new formation troop's workshops were formed.

A New Corps - RCEME

This system drifted along until 30 March 1943 when Colonel H.A. Guy, on loan from REME submitted a memorandum which reopened the question of forming a new corps. He pointed out that the engineering side of RCOC had been small compared to the stores side, but by 1943 in the Canadian Army Overseas the situation was reversed. Two-thirds of the greatly-expanded RCOC in the UK was engineering. However, all of the administration for the corps was in the hands of the stores side. The engineering branch had no real control over its organization.[7]

His suggestion of forming a new corps was rejected. The reasons cited appear to include increased overhead for administration, and the new corps being too small to have sufficient rank and prestige to deal with senior officers in the army. These reasons and others were discussed in the Saturday Night magazine of 21 August 1943 in an article written by Mr O.T.G. Williamson. In closing his article, Mr Williamson stressed the need of having technical units commanded by qualified engineers. The debate had gone public and had taken a new twist. With that, the Engineering Institute of Canada took up the cudgel.[8]

The Institute's Engineering Journal, with Mr Austin Wright as editor, had commenced publishing a

5. Corp, Brig P.J.G.,; *What's in a Name?*; Journal of the Royal Electrical and Mechanical Engineers; No. 42, 1992; pages 3-5.
6. Hodgson, op. cit., page 374.
7. Hodgson, op. cit., page 384.
8. Hodgson, op. cit., page 388.

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series of articles on the formation of REME in early 1943, continuing through the summer.[8] In July 1943, a question in the House of Commons regarding action "to establish a separate corps similar to REME"[9] drew the response that it was under study. In commenting on this, Mr Wright concluded that the refusal to form a new corps was based on the selfish interests of non-technical persons in the RCOC.

Meanwhile, some craftsmen took matters into their own hands. In their minds one item, identity - which is very important to individual craftsmen - was being forgotten within the debates raging in higher headquarters. Major L.D. McBride, an RCOC(E) officer, had been attached to the British Army in North Africa in early 1943 (see page 36). He was constantly embarrassed by the necessity of explaining why, as an EME, he was still wearing RCOC badges and red backing on his rank badges instead of blue. He settled the matter by adopting a beret with a REME cap badge.[10]

On 9 November 1943 the endless debate on the new corps based on professional and self-interest reasons was concluded by a requirement based on operational reasons. At a conference that day to discuss fourth-echelon repair in event of OVERLORD, Brigadier J.H. MacQueen, the DQMG from CMHQ London, noted, "The time has come when we should reorganize the repair and maintenance services as a separate RCEME Corps."[11] The rationale was the close working relationships in battle between Canadian and British Craftsmen and their units. In his report on the conference, Major-General J.V. Young, the Master General of the Ordnance from NDHQ, concurred as did General McNaughton.

The debate was now over. On 20 January 1944 a committee chaired by Brigadier R.B. Gibson, which had been asked to make recommendations on reorganization or equipment maintenance services throughout the Canadian Army, made its report. It recommended the organization of a Corps of Canadian Electrical and Mechanical Engineers (CEME) in the Canadian Army Active and Reserve. The committee further recommended that this be a "Royal Corps" and that it be subsequently named the Corps of Royal Canadian Electrical and Mechanical Engineers.[12]

A submission was sent to the Governor-General the next day and was approved on 24 February 1944, effective 1 February 1944[12], and CEME came into being that day. The King gave royal approval on 2 April 1944[13] and the official title became Royal Canadian Electrical and Mechanical Engineers, abbreviated as RCEME.

Canadian Army Routine Orders then announced the organization and formation of the new Corps, and the transfer of units to it. The first units to be called out were approved by the Privy Council on 19 May 1944. This approval, however, was effective 15 May 1944 and it was this date that became the Corps' official birthday.

Canada's Craftsmen now had their own corps and their own identity, two things which they had long wanted and of which they became justifiably proud, as they proved in battle. But rebadging, as compared to 1991, could be described as reluctant and austere - it was in the middle of battle.

Rebadging 1944 to RCEME

RCEME was proclaimed at a large parade at Canadian Ordnance Reinforcement Unit[14,15] at Bordon, England on May 15th, 1944. The soldiers paraded in battle order and were divided into two groups, supply and engineering. There were no new RCEME hat badges available for this "rebadging" ceremony. Therefore, to symbolize the transfer from RCOC to RCEME, the RCOC(E) soldiers laid down their rifles as RCOC and then picked them up as RCEME. That evening there was a mess dinner for the senior officers and Lieutenant H.E. McLaughlin acted as Vice-President of the Mess Committee. This was the first RCEME mess dinner![16]

There were R.C.E.M.E./Canada flashes but very few RCEME hat badges in England. Those that were, were destined first for the fighting troops, i.e. Italy and the D-Day assault force. Many continued to

9. *Proceeding of the House of Commons* (Hansard), 21 and 22 July 1943.
10. Hodgson, op. cit., page 376.
11. Hodgson, op. cit., page 382.
12. Hodgson, op.cit., page 383.
13. Hodgson, op.cit., page 393.
14. The name was changed to Canadian Ordnance and Mechanical Engineers Reinforcement Unit (COMERU) later.
15. Canadian Army Newsreel Number 31; excerpted in *EME National Anniversary Celebration Weekend*; video edited and directed by the staff of CFSEME and produced by Joyner Productions, 1995.
16. McLaughlin, Lt H.E.; interview with the author, 1995.

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wear RCOC badges with RCEME flashes and Blue pips. The few badges that came over to England initially were brought by reinforcements. These badges were quickly "borrowed" and used as models for casting badges in the workshops.

Rebadging to RCEME in 1944 was very casual. There were few parades, it was just a simple "go and pick up your badge." For varying reasons some were rebadged early, some late, some twice and others got to wear REME badges for awhile. Canada's Craftsmen were in battle and there was little time for ceremonies. Just after the Battle for Monte Cassino, Craftsman A.A. Stodalka was handed a RCEME badge and was told that a new corps had been formed and that he was part of it. At the time he was a member of an artillery LAD RCOC(E) and was wearing an artillery badge. It identified him as a member of a forward unit and in unit lines it made him part of the regiment. "I put the new badge in my pocket and carried on. I didn't wear it except on leave," he recalled fifty years later. "It didn't mean as much to us then as it does now. At the time I was busy doing a repair job."[17]

A month earlier, in April, the troops that would be landing on D-Day were "quarantined" as a security measure in camps around Southampton, England. They included 3rd Division RCEME. "New RCEME badges were available in the quartermaster stores in April. You just went and picked them up," recalled Captain A. Mendelsohn and Major W.G. Hamilton, "The only way to ensure that we had our RCEME badges on 15 May was to us give us our new badges beforehand."[18,19]

Sapper K. Bateman landed in Normandy in July 1944. At the time he was a machinist with 10 Field Park RCE in the E and M Section. "One morning at the Falaise Gap," he remembered, "I received a new hat badge and was transferred to RCEME. Most of the 70-odd members of the section were also transferred."[20]

Craftsman C.J. Brown landed on D-Day as a regimental armourer. He had been rebadged to RCEME earlier. However in the heat of battle there was a danger that he would not be recognized as a Canadian soldier since there were German infiltrators in his area.. The RCEME badge was not well recognized by the front line soldiers of his battalion. Consequently he was rebadged temporarily on the battlefield to North Nova Scotia Highlanders. "I wore that badge with pride until December when I was posted to a workshop," he recalled.[21]

Warrant Officer (Class 1) W.H. Norton recalled that members of 2 Advanced Base Workshop were authorized to wear REME badges until new RCEME ones became available or were produced in the shop.[22]

Phase 2 RCEME[23]

The formation of RCEME was part of a plan for reorganizing maintenance and repair services in the Army, including the personnel assigned to these tasks. The plan was to be implemented in two phases. Phase 1 was accomplished during World War Two (see page 268). Phase 2 of the plan was to be activated at some later date.

Left untouched by phase 1 were combat unit tradesmen, such as artillery gun fitters, infantry unit vehicle mechanics, armoured unit mechanists, transport company workshop platoons and other technical personnel such as radio mechanics in signal units and radar mechanics in some artillery units. All these personnel wore the badges of their unit or corps. Phase 2 was to bring these tradesmen into RCEME. The advantages to them were optimized training and improved career opportunities. Another advantage was standardized technical control over an ever-expanding range of increasingly complex equipment. The Canadian Army activated Phase 2 RCEME during 1953/54. With the exception of radio mechanics in the Royal Canadian Signals Corps, who remained with that Corps, all other maintenance tradesmen were rebadged to RCEME and all unit establishments, including light aid detachments, were adjusted accordingly.

This process was a trying time. It was especially heart-wrenching for many loyal and dedicated tradesmen whose military life had been tied to famous combat units or corps. Many of them were quite specialized, but limited in the scope of work they performed. Consequently, many had to undergo retraining to expose them to higher levels of repair and to a wider range of equipment. At the same time they brought

17. Stodalka, Mr. A.A.; rebadging 1944; taped interview with the author; 1995.
18. Hamilton, LCol W.G.; telephone interview with the author, 1995.
19. Mendelsohn, BGen A.; taped interview with the author, 1983.
20. Bateman, Mr K.; *Rebadging 1944*; taped interview with the author; 1995.
21. Brown, Cfn C.J.; *Memories of a Wartime Craftsman*; published in the EME Journal, Autumn 1984.
22. Norton, Maj W.H.; interview with the author, 1995.
23. Boughton, Col J.C.; unpublished notes on Phase II RCEME; 1995.

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with them a wealth of experience and knowledge of methods of supporting combat units. Of special note was the value obtained from the mechanist sergeant-majors from the armoured corps. In time, these tradesmen became dedicated RCEME technicians and they benefitted from their expanded career opportunities.

With Phase 2 RCEME achieved, the recommendations of the studies and reports made during the 1940s had been completed, with RCEME becoming the home of most of the electrical and mechanical technicians in the army.

Keeping an Identity - Unification and LORE

On the unification of the Canadian Forces on 1 February 1968, all corps such as RCEME were disbanded and special distinguishing rank titles such as Craftsman were abolished. What had been the bulk of RCEME was combined with the engineers and technicians of the former MSE Branch of the RCAF to form a new Branch. It didn't have a name. In addition, all Craftsmen became privates. It was a complete loss of identity. Morale plummeted. A new name and badge had to be chosen for the new Branch. But first the old organization had to be put to rest. It was done in style as "They buried the Craftsman on the Mattawa today!"

Burying the Craftsman

Natural resistance to change and twinges of regret led the maintenance company at CFB Petawawa to organize a unique funeral for the craftsman, as reported in the base newspaper at the time. "They buried the old craftsman last Friday on the Mattawa Plain," noted the Base newspaper. "This mainstay of all RCEME tradesmen had faithfully served throughout the short 25-year history of the Corps. He was laid to rest with all the pomp and ceremony due to a faithful servant of his country. The hill at the corner of Brindle and the Stadacona Road was then declared sacred RCEME ground forever."[24]

Twelve years later, Master Warrant Officer W. Goundry, one of the original organizers of the funeral for the craftsman, was again posted from Petawawa. His friends decided that a fitting farewell would be to resurrect the old craftsman. With some difficulty, the original site was found and the scenes enacted in 1968 were repeated, including the mysterious incantation from the sacred EME manual. Of course, the coffin lid then flew open, revealing a somewhat battered "Old Craftsman."[25] In the general good humour of the moment, there was a message that should not be forgotten. "It should be remembered that the spirit of the craftsman still lives on in the hearts and memories of many. His accomplishments have not been forgotten because he still provides the foundation on which the tradesman of today builds."[26]

It was a portent for the future. It was more than separate identity that they wanted: they wanted their identity to be RCEME - or as close as possible to that.

But that would take time. First they had to select a badge and a name for their branch.

Choosing a new Branch Name

The EME Branch name is a source of pride for Canada's Craftsmen because it identifies them as the soldier-technicians and soldier-engineers of the Canadian Armed Forces. This identity started in 1914 when the Engineering Branch of the Canadian Ordnance Corps was formed. In 1944 the formation of the Corps of RCEME gave them a separate identity as an engineering corps.

A name had to be chosen for this new Branch. Therefore, at the time of the annual conference in the spring of 1968, several of the Corps' senior officers - including the then-Head of Corps of the Corps of RCEME, Colonel A.L. Maclean, Colonel G.W. Bruce and Colonel A.M. Reid - met in Colonel Maclean's office in the White House at the RCEME School to choose a branch name and to recommend it to CFHQ for approval. The alternative to this action was to have a new branch name imposed by CFHQ without reference to those in the branch.

24. Petawawa Post, Aug 68.
25. This time the "Craftsman" was a real person, Sgt F. Smith.
26. Petawawa Post, Sep 80.

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The group met and quickly agreed that the word, "Engineers", should be in the new branch name. After lengthy consideration of many alternatives, they agreed on the word Ordnance. The selection of this word had a certain nostalgia since they were all former Ordnance Mechanical Engineers. More importantly, ordnance was a military word. However, the air force and the navy had different uses and understandings of this word. To eliminate confusion the new branch title was completed with the addition of the word "Land". Their recommendation was accepted and promulgated by CFHQ and Land Ordnance Engineering became the branch name.

The choice was not accidental. The words "ordnance" and "engineering" had proud military traditions dating back over a thousand years. The combination of these two words in the Branch name aptly described the scope of the LORE Branch, which included the engineering aspects of acquiring land equipment and keeping it in service, in other words, equipment engineering.

Military engineering is the oldest of the engineering skills and military engineers were the first scientific soldiers. Out of their experience the profession of civil engineering came into being. Since then, the arts of military engineering and civil engineering have developed side-by-side.

During ancient times, fortifications, road building and bridging were the predominant tasks of the military engineer. But the Roman military engineers were active in weapons development too. They developed battering rams, catapults and ballistics; all early types of siege artillery. Later, in the middle ages, the military engineer was involved in casting cannon and mixing gunpowder, again primarily as siege weapons. However, with the development of cannon as field artillery, as well as the introduction of hand guns, the function of weapons engineering - that is, ordnance engineering - began to develop as a separate branch of engineering. The appointment in the United Kingdom of the first "Master of the Ordnance" in 1417 marks the start of this separation, which was completed by the formation of the Board of Ordnance in the United Kingdom in 1683. From then on, military engineering became exclusively associated with civil engineering, while the Board of Ordnance was responsible for the supply, storage, maintenance, development and manufacture of army weapons. Thus ordnance activities included the authority for design, development and modification of weapons system - duties which are to-day associated with what we understand as the design authority. Ordnance activities, however, were carried out by civilians.

The 19th century saw many changes. The replacement of the Brown Bess musket with Enfield rifles in the 1830s led to the requirement for the militarization of armourers. Fortress guns became so large that military specialists were required for their maintenance. The scandalous activities of supply contractors during the Crimean War led to the militarization of the maintenance and storage of all military stores during the 1870s. In 1896 these functions were all brought together in the UK on the formation of the Army Ordnance Corps. Canada followed suit on 1 July 1903 on the formation of the Canadian Ordnance Corps.

The next year, the first Master General of the Ordnance (MGO) in the Canadian Militia was appointed. The office of the MGO included the directorates of artillery and engineering services. Therefore, for artillery and field engineering, the MGO was the design authority and, in addition, he had responsibility for unit-level repairs. As other types of equipment such as tanks, trucks and radios appeared, similar responsibilities were assigned to appropriate user branches. The Directorate of Ordnance, which was part of the Quarter-Master General (QMG) Branch, was the maintenance authority, and the Ordnance Corps workshops were responsible for repairs of all equipment other than those at unit level. Thus, for any one type of equipment the design authority and maintenance authority were split at the branch level.

In 1936, the Directorate of Ordnance was transferred to the MGO Branch and was re-absorbed shortly after World War Two, on the demise of the MGO Branch. Design authority and maintenance authorities were now combined at the branch level but were still separated at the directorate level. However, the word "ordnance" now became associated with supply, storage, second- to fourth-line maintenance and some aspects of maintenance authority. The word "engineering," on the other hand, became associated with the design authority, which was part of the design and development directorates in the QMG Branch (see page 186).

On the formation of the Corps of Royal Canadian Electrical and Mechanical Engineers (RCEME) in 1944, the major responsibility for maintenance went to the new Corps while the supply and storage aspects remained with the Ordnance Corps. As a result the word "ordnance" gradually became associated with the non-technical functions (supply and storage) only.

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After World War Two, the increasing complexity of equipment required extensive, often similar, engineering skills for the design and maintenance authorities during all stages of equipment life. Although the design authority continued to be organized separately from the maintenance authority, RCEME officers and technicians participated in both areas of engineering. During the time of integration, the Director General of Ordnance Systems (DGOS) division was one of several divisions formed in CFHQ. Each division had duties that included the design authority for a range of equipment. Once again the word "ordnance" was associated with engineering, but still excluded maintenance. During this same time it had also become known that a new system of branches would be formed to replace the then-existing system of corps and services. In some cases the functions of a particular corps or service were the same as the new branch, so that naming the new branch was a simple matter, eg artillery branch, air operations branch. In other cases, such as RCEME, the functions of the new branch were, in the main, the same as the old corps but there were significant deletions, as well as significant additions. It became evident, therefore, that RCEME would not be accepted as the name for the new branch.

On the formation of the branches in 1968, "Ordnance" became exclusively an engineering term since the supply and storage aspects of military equipment went to the Logistics Branch. The range of ordnance equipment now embraced all of the land technical equipment of the former three services except communication equipment.

In 1973, the design authority and the maintenance authority were combined. A new division, Director General of Land Engineering and Maintenance (DGLEM), was formed to be responsible for the combined functions for land ordnance equipment and other assigned equipment such as clothing. Ordnance activities were once again associated with all aspects of land ordnance equipment engineering. But, unlike 1693, these ordnance activities were carried out by the members of the LORE Branch.

Pride in an Identity - from LORE to EME and The Horse is Back!

The new name was never fully understood. At best it was tolerated, while Craftsmen yearned for the "return of the horse" and to once again become "RCEMEs." By the late 1970s, there was an air of despair in the Branch. Many of its members felt that they had lost all of their traditions: it was the end of the world. Never mind the benefits of integration, which brought all of the vehicle mechanics in the Canadian Forces into one trade, they had lost the aircraft, radio, radar, welder and body repairman trades. Never mind the fact that they had been able to preserve their separate identity as an engineering corps; they had lost their badge and their name. The RCEME veterans distanced themselves from the new LORE Branch and formed the RCEME Association to preserve the RCEME name. So there they were, two separate solitudes; the veterans who had no future and members of the LORE Branch who had no past. It was an open wound that was healed by renaming and rebadging.

Renaming 1984 - LORE to EME

In 1982 the Branch Advisor, Brigadier-General J.G.R. Doucet, had the Colonel Commandant, Brigadier-General A. Mendelsohn, ask the Chief of the Defence Staff, General R. Withers, if there was any problem in having once again the words "Electrical and Mechanical Engineering" in the Branch name. The rationale cited was the difficulty in recruiting because people could not relate to Land Ordnance Engineering. General Mendelsohn also asked if the reason for the change from RCEME in 1968 was still valid, i.e. the need for a name that was neither RCEME nor RCAF.

General Withers allowed that time had passed and there was no longer a need for a non-RCEME, non-RCAF name. He also agreed with the recruiting problem. At the time, it was considered that there would be a problem if the "RC" were to be reinstated. Therefore, in the interest of not delaying the matter, the Branch name was changed to Land Electrical and Mechanical Engineering (LEME) Branch.

The official name change occurred at the EME 40th Anniversary parade at the School on 15 May 1984. Signing the official scroll were Major-General J.A. Fox, Chief of Personnel Development at NDHQ, Colonel G.W. Bruce, the Colonel Commandant, and Brigadier-General Doucet.[27]

27. *RCEME 40th Birthday*; EME Journal Autumn 84, page 15.

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Rebadging 1991 - The Horse is Back!

The Craftsmen still wanted their horse badge back, so in the latter 1980s work was started to design a new badge based on the old RCEME horse badge (see page 280). The desire for change was particularly noticeable in the young Craftsmen, none of whom had worn the RCEME badge! In the end, their wish was the deciding factor. The committee recommending approval had thought the push for the horse badge was coming from the old colonels and chief warrant officers!

The final hurdle was to get five approving signatures ranging from the Director of Ceremonial through to the Chief of the Defence Staff. The Branch Chief Warrant Officer, Chief Warrant Officer R.E. Roy, managed to do this in one day! He admitted, "I even cornered one general in an elevator." It was a reflection of the high esteem in which the Branch was held: they who serve and support were themselves supported. Chief Warrant Officer Roy was appointed a Member of the Order of Military Merit.

At the EME Senate meeting that autumn, the problem to be addressed was how to get the badge manufactured and distributed. There were two choices. Hat badges are a free issue. However, the waiting period for contracts and funding was estimated to be four years. This was patently not acceptable. The other choice was to have the badges privately purchased. "The men will buy their badges," stated Chief Warrant Officer Roy. With that approbation, the upfront money was loaned from the EME Branch Officers' Fund and a contract let. The money was quickly collected and the new badges were produced, accepted and available by the spring.

There are three points of interest in this. The first is that, in some cases (such as the 3rd Battalion of the Royal Canadian Regiment), the regimental fund bought the badges for their maintenance platoon. The second is that the Branch Chief Warrant Officers' Conference that year had indicated that the Craftsmen were willing to buy their badge in order to get the horse back. The third is that Chief Warrant Officer Roy was awarded the DGLEM Award for his part in "Bringing back the horse to the LEME Branch."

The whole affair was an act of faith that was proven right within the Branch. It gave impetus to a resurgence in Branch spirit that culminated in the EME 50th Anniversary Celebrations three years later. It also set the stage for the joyous rebadging ceremonies that quickly followed.

In May 1991, in a series of ceremonies across Canada, in CFE, and in peacekeeping missions around the world, members of the Branch were rebadged from the LORE badge to a new badge very similar to the old RCEME horse badge. On May 9th, the first rebadging ceremony was held at LETE. The parade comprised LEME members from Ottawa along with the Command SSOs Maintenance and their CWOs. The parade served as a symbolic rebadging of the Branch. The reviewing officer was the DGLEM, Brigadier-General R.N. Fischer, the parade commander was Colonel G.A. Walsh and the parade RSM was Chief Warrant Officer R.E. Roy. The guests of honour included several former DGLEM's including Major-General(Retired) E.B. Creber and Brigadier-General(Retired) R.B. Screaton, and Brigadier-General J.I. Hanson.

The badges were blessed by the Deacon, Colonel W. Svab, the Colonel Commandant, acting as the RC padre, and by The Reverend D. Chisholm, the RCEME Association's padre and himself a former Craftsman. The first person rebadged was Craftsman D. Twigg as the junior person on parade. The second person rebadged was Colonel A.L. MacEachern, the senior LEME officer on parade. Generals Fischer and Hanson and Colonel Svab then proceeded down the ranks and personally presented each "Craftsman" on parade with his/her badge. Following this, the badge changing formally took place under the commands "remove headdress," "replace badge" and "replace headdress."

Following this parade there were a series of rebadging parades across the country during the next four weeks. As many as possible were presided over by a LEME colonel or general. The Colonel Commandant, for example, presided over rebadging parades in St. John's, Newfoundland and later in Goose Bay, Labrador. But senior LEME officers did not preside over all parades. Often the base commander (army, navy or air force) or a RCEME veteran did the honours, thus reinforcing the point that EME serves everywhere. The style of ceremony varied too. In Esquimault, the old badge was "buried at sea" in a naval ceremony befitting Maritime Command. In Calgary, as in Valcartier and CFE, there were large parades combining all units. In several parades there was a horse on parade to re-emphasize the fact that the "horse is back!"

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On 3 June 1991 at 1130 hours local time, the Canadian Contingent United Nations Iraq Kuwait Observer Mission (UNIKOM), Canadian Engineer Maintenance Troop rebadged in a brief ceremony presided over by Captain H.D. MacLean, the troop commander. This was the last official rebadging ceremony, as General Fischer told him during a phone call after the parade.

Many of these ceremonies were combined with Corps birthday parties and sports days. However, underlying the whole affair was a sense of pride - we had kept our identity as Canada's Craftsmen. More importantly we had the identity that we wanted - We were EMEs and The Horse Was Back!

Some of the parades featured a white horse draped with an EME flag marching with the troops on parade. A new tradition had been started. It also marked a notable surge of interest in things EME.

On a more sober tone, the Branch Advisor, Brigadier-General R.N. Fischer, noted, "We have once again donned the insignia of our historical past; it is time to concentrate on equally important and pressing issues."[28] The high esprit de corps generated by the rebadging also produced a willingness to do well. Canada's Craftsmen were well prepared for the surge in peacekeeping taskings and for the reductions that were just around the corner. It was the old work hard/play hard, which was an EME characteristic. But often people wondered how we did it - they wondered what makes us EMEs tick?

The EME Image - What makes us EMEs tick?[29]

Have you ever wondered what makes us EMEs tick? What keeps us together? What is the secret of our success? It's a good question to ask. In January 1994, the Canadian Junior Hockey team won the gold medal at the Junior Hockey World Championship. Noting that the top ten Canadian Junior players were not on the team, one of the team members said, "We're the no-name team that won! We knew what had to be done and we did it!" That very neatly sums up us EMEs - low visibility, team spirit, no stars, get on with it, do a good job whenever, wherever, no fuss, no muss.

"They shall be fully combatant in the widest possible sense." This extract is from the General Order authorizing the formation of RCEME in 1944.[30] It means that we are to be soldier-technicians. To understand what this means in the 1990s, just ask one of the recovery mechanics on one the supply convoys bringing up the rations, fuel, mail, and spare parts to our embattled CANBATs in Bosnia. These supply runs are no rear area moves. They were delayed and threatened at the check points. They were forced to endure long and tortuous routes over secondary roads and mountain trails. They are often subject to sniper fire. When they couldn't get through, the CANBATs went on hard rations. Just ask the EME technicians who served in the CANBATs.

In Croatia, it's not only just the supply runs where our soldier skills are needed. During the 1R22eR's move into Sarajevo in 1992, a reconnaissance convoy was bombarded on returning from the airport. A jeep was hit and immobilized. The column's recovery mechanic, Corporal J.J. Boudreault, was already towing a vehicle with his recovery vehicle. Unhooking it, he came forward, got out, hooked up the jeep and recovered it back to safety - in record time - thus opening up the road again and getting the jeep crew to safety. He was awarded a CDS Commendation.

During D-Day in World War Two, Craftsman C.J. Brown, an armourer in the Nova Scotia Highlander's anti-tank platoon, landed with his unit in the initial assault waves. For the first few weeks until the unit came out of the line after Falaise, he fought as a gun number by day and as an armourer by night. Early on that morning, Captain P.C. Neil landed with his Sherman armoured recovery tank as part of the 1st Hussars. He immediately started recovering stalled and stuck vehicles from the exit routes of the beach. The next day, Artisan A. Breton landed as part of one of the beach recovery groups. With only his rifle and his tool box, his job was to try and fix stalled vehicles to help keep the beach clear. RCEME Craftsmen were part of the leading elements of the assault force.

Being "fully combatant" didn't just start with RCEME. In fact it's an idea that's been around for as long as soldiers have had the care of equipment as part of their duties. For example, in 1901 the order

28. Fischer, BGen R.N.; *From the DGLEM*; EME Journal summer 91, page 2.
29. Johnston, Colonel M.C.; *Colonel Commandant's Comments*; EME Journal 2/94, page 3.
30. General Order 127/1944 dated March 1944.

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authorizing the formation of the Canadian Ordnance Corps used the term in describing its armourers, artificers and blacksmiths. Later, in March 1918 during World War One, Artificer Staff-Sergeant A.E. Davis' gun battery was heavily shelled. Five guns were put out of action. After five hours' work under fire, he succeeded in getting four of them back in action. During this time the officer and four gunners were wounded and two were killed. Staff/Sergeant Davis was awarded the Distinguished Conduct Medal.

Individually, Canada's Craftsmen have always been proud of their accomplishments. "We moved seven times in six months and the VOR line was never any longer than three vehicles!" said Corporal R. Daley on returning from Croatia in 1992.

As a group, we are becoming more aware of our accomplishments. On returning from the Gulf War, Corporal B. Demary said "EME was always where the action was." He was right. Members of the Branch served everywhere in the Gulf War. Our flag flew on the Iraqi border with the field hospital and at the airfield with the CF-18 squadrons. In addition, the ships had EME technicians to maintain the on-board anti-aircraft weapons specially fitted for the Gulf, and the attacking British division had three EME officers in its LADs or workshops.

We are a Branch with a single focus, badge, uniform and job. We fix equipment, whenever, wherever, under any conditions, no questions asked. Wherever there are Canadian Forces bases or stations you can find an EME workshop - sometimes big, sometimes small. With that and our high esprit de corps you can say that "we are a regiment of very many, very small units - everywhere."

One of the keys to our success is the way we fit in and become part of whatever unit we are in. Often I see on unit notice boards that the airman or soldier of the month is an EME Craftsman. Yet when I go to the workshop area, the walls are festooned with EME colours and badges. This reflects our "two-part" loyalty. The first part is loyalty to the unit that we serve and are part of, e.g. CFS Gander, 2RCR, 202 Workshop Depot, etc. The second part is loyalty to our Branch.

In May 1993 I went to Cyprus for the UN medals parade of my old unit, 2RCHA. The regiment was represented on parade by two 50-man guards. The remainder of the regiment remained on duty patrolling the Green Line. As the regiment marched on parade, I quickly spotted six Craftsmen in the ranks. Their badges and belt buckles were very distinctive! The medals were presented by three VIPs, one for each rank. Each VIP was assisted by a sergeant carrying the medals on a cushion. One was an EME sergeant. "We don't take over, but we are always part of the units we support."

"Though all the maintainers worked hard, they were also notorious for playing hard," recalled Lieutenant G.L. Hyttenrauch of his tour in Croatia in 1992. "The first big social event was the EME day celebration. The maintenance platoons of both 1R22eR and 4CER combined for it. There was a BBQ and a variety of different sports for everyone to participate in. It was a huge success and was just what everyone needed to blow off some steam and reduce tensions."

The camaraderie and informal contact among all ranks that Corps birthday parties, bonspiels and sports days give us is the glue that keeps us all together. However, the value goes beyond these events. The team work, leadership and organization needed to set up and run them are the very skills that many our Craftsmen have picked up and are able to use in the work place or on a tough job out in the field. We say, "We work hard and we play hard." We could also say, "We work hard *because* we play hard."

Over the years we have been forced to change our badge and our name. Yet for 50 years we have proudly kept our separate identity as an engineering corps. In addition, we have never changed our focus. We do a good job wherever we are. We can be counted on. How often have you heard a gunner, sapper, trooper or rifleman in trouble call out, "...go find the RCEMEs!"

We are a regiment of very many, very small units - everywhere. Moreover, we are everywhere the action is! Our image is the mobile team commander master-corporal and his or her team out in the forward areas doing a difficult job under dirty and dangerous conditions and - doing it well with no complaint.

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Chapter 20 - THE EME TRADITIONS

Symbols, Memorials, Trades, Appointments, Sports, Skill Demonstration Teams, Institutions, Affiliations, Families

Electrical and Mechanical Engineering (EME) traditions are rooted in the distinguished traditions of their predecessors. Underlying these traditions is the idea of a soldier-engineer as expressed by the EME motto Arte et Marte, which means "By Skill and by Fighting." EME traditions have given Canada's Craftsmen cohesiveness, pride and motivation which, in time of peril, have provided them with that extra drive and esprit de corps so necessary for victory. Today, Canada's Craftsmen are visible and valued all across Canada and wherever Canadians serve as Peacekeepers.

Symbols

Branch Name, Motto, Titles, Hat Badges, Other Accoutrements, Colours, Flag, Commemorative Monument, Patron Saint, RCEME Prayer, March, Birthday, Trophies, RSM's Cane, Freedom of the City

Branch Name

The EME Branch name is a source of pride for Canada's Craftsmen because it identifies them as the soldier-technicians and soldier-engineers of the Canadian Armed Forces. This identity started in 1914 when the Engineering Branch of the Canadian Ordnance Corps was formed. In 1944 the formation of the Corps of Royal Canadian Electrical and Mechanical Engineers (RCEME) gave them a separate identity as an engineering corps. In 1968, RCEME was disbanded on the unification of the three services. What had been the bulk of RCEME was combined with the engineers and technicians of the former MSE Branch of the RCAF to form a land equipment engineering and maintenance branch. The Branch name chosen at that time was the Land Ordnance Engineering Branch (see page 271).

However, the mystique that was RCEME was too strong. The name LORE did not have the tradition that had been associated with RCEME and there was an intense feeling of loss. In 1984 the Branch was redesignated the Land Electrical and Mechanical Engineering Branch. In 1994 it was renamed simply the Electrical and Mechanical Engineering Branch.

Motto

The Branch motto is Arte et Marte, which means by skill and by fighting. This motto was adopted by REME soon after it was formed. Two years later the REME motto was adopted by RCEME. It has remained the Corps/Branch motto for over 50 years.

Titles

Craftsman/Artisan is close to the hearts of all members of the Branch. The term, a time honoured name for any skilled person, came into accepted military use with the formation of RCEME in 1944, and soon became the official designator for the rank of private. It remained in use until reorganization in February 1968. By 1982, however, by dint of much hard work by the Branch Adviser, Brigadier-General R.B. Screaton, the use of the term was being informally reinstated. At the TQ3 Passing-out Parade at CFSAOE in December 1981 the inspecting officer, Colonel L.A. Leflar, himself a former RCEME Craftsman, called each of the new graduates "Craftsman" instead of Private. General Screaton used the word "Artisan" as the French translation of craftsman at a similar parade at the école technique des forces canadiennes in

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November 1981. Today the term is unoffically used as the designator for the private rank in the EME Branch.

Artificer. This term was used in the 1780s as part of the United Empire Loyalist regiments which had been formed and stationed around Montréal during the Revolutionary War. One had a company of artificers which did odd jobs including equipment maintenance in the winter and operated the bateaux used to transport the regiment by river in the summer.

In 1882 a Corps of Ordnance Artificers was formed for the repair of artillery equipment.[1] This Corps was absorbed into the Army Ordnance Corps in 1896, but the term lived on as the designator for the top level armament tradesman. For many years the link between the tradesman and the engineer was the artificer or "tiffy."

Prior to 1939, only the armament trade had artificers. They were recruited from civilian trades. Stringent entrance requirements, including a comprehensive general trades test, ensured that only 10% of all applicants survived the initial screening phase. The Ordnance Mechanical Engineer (OME) made the final selection. The selected applicant was enrolled as a private one day and promoted to Staff-Sergeant (on probation) the next. He was sent to the nearest army unit to be taught the required military skills and then returned to his unit. He was teamed up with a qualified armament artificer to begin learning military equipment, and applying the skills learned in his former civilian trade. After a probation period of about five years he was sent to Woolwich, England to attend armament artificer training. On graduation he became a staff-sergeant-artificer and returned to Canada to serve his mandatory six years of service.[2,3]

During World War II, artificer training was speeded up and organized for other trades as well. "Tiffy" courses were conducted in England, but none in Canada. In 1946, new trade specifications brought new training methods. After the war, training was repatriated to Canada as facilities and instructional staff were brought up to speed.

An artificer candidate selected after the war had to be a group three tradesman, usually a sergeant, with at least three years in rank. He had to have proven supervisory ability and be recommended by his CO. Before being selected for a tiffy course each candidate had to pass a stringent pre-assessment. These were initially conducted at the RCEME School but later decentralized to command writing centres under control of Command EMEs. During this period there were, at times, a shortage of sergeants suitable for selection as artificer candidates, and a number of well-motivated corporals passed their pre-assessments and went on to complete artificer training.

Integration ended artificer training. It was judged too expensive and out of date. The closest equivalent was the trade group 6B course that evolved for each trade under performance-oriented training. This training has since been discontinued in favour of formal training at the 6A level, which is now the senior technician level in each trade.

Light Aid Detachment (LAD) was first officially used in General Order 135139 dated 1 September 1939, which authorized the formation of army field workshops, each having a number of LADs. The first mention[4] of an LAD being formed and used, however, appears in the report on permanent force training in Camp Borden during the summer of 1938. This LAD was staffed by one officer and nine men from Military District 3 (Kingston). The report notes that "a base workshop was established in No. 1 hangar, while the LAD and vehicle section moved with the force in the field."

The concept of the LAD, however, dates from September 1914 when a workshop lorry was fitted out and sent to the front for use in repairing guns close to their batteries.[4] The success of this idea quickly led to more vehicles and artificers being sent forward to work directly with arms units. As a result the idea of the LAD was born. It was used until 1 August 1963 when the LADs were disbanded and reformed as organic unit maintenance platoons/troops.[5]

Bluebell was used as maintainer's, i.e. REME/RCEME, call sign in the British army staff system. Its origin is not certain. With the change to the international staff system it was replaced by "88".

IOMs, OMEs, EMEs, RCEMEs. Today's EME officer can directly trace his/her lineage back to

1. Hamilton, LCol W.G.; *The Corps of RCEME - Historical Background*; unpublished; pages 4-6.
2. RCEME Technical Bulletins 2/4, 4/3, and 11/2; and RCEME Director's Letter No 12, 17 Aug 59.
3. RCEME's Director's Letter No 12.17 Aug 59.
4. Hodgson, LCol R.A.; *The Corps of RCEME - a History to 1 Oct 1946*; 1963, pages 398-404.
5. *Disbandment of LADs in the CAR*; AHQ file 2001-1110 TD 2117, 1962.

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the immediate post-Crimean period. At that time, as a result of scandals connected with the supply and maintenance of equipment, the commander-in-chief of the army became responsible for the maintenance of equipment under his command.[5] Two specially-commissioned artillery officers known as Inspectors of Ordnance Machinery (IOMs) were responsible for fortress gun maintenance. On the formation of the Army Ordnance Corps in 1896 they were redesignated Ordnance Officers. The term was changed to Ordnance Mechanical Engineer (OME) in 1919.[6] On the formation of RCEME in May 1944 it became Electrical and Mechanical Engineer (EME), the direct predecessor of Land Ordnance Engineer. In 1984, on the redesignation of the LORE Branch to the LEME Branch, the officers of the Branch once again became EMEs.

Today, the terms *EMEs* and *RCEMEs* are sometimes used to designate collectively any member or groups of members of the Branch. How often have you heard a gunner with a truck stuck in the mud calling, "Where are our RCEMEs?"

Hat Badges

Canada's craftsmen have worn many badges - the various versions of the Royal Canadian Ordnance Corps badge the longest. The original version of this badge received official approval in GO 36/1904 and depicts the Board of Ordnance Arms surmounted by a beaver.[7] The Arms comprise three field pieces in pale and, on a chief, three cannon balls. The beaver was selected as something typically Canadian. In 1922 it was replaced by the crown, and the Garter motto and the prefix 'Royal' were added. The 1926, and final, version of the RCOC badge had the full name of the Corps added. The original badge is still in use today as the symbol of the Longue Pointe Garrison Officers' Mess, the home mess of 202 Workshop Depot.

The first RCEME badge was taken into wear in March 1944. The bulk of the RCOC(E) was re-badged to RCEME in May 1944. However, 3 Canadian Infantry Division and 2 Canadian Armoured Brigade were concentrated in special camps early for the Normandy D-Day landings. RCOC(E) personnel of the invasion formations were re-badged (cap badge and shoulder flashes) to RCEME in late March and early April 1944. As described in GO 236/1944, this RCEME badge comprised three shields, the whole surrounded by a laurel wreath surmounted by the Royal Crown and, below, a scroll with the initials "RCEME" The wreath of laurel is a symbol of service and gallantry in battle. The Board of Ordnance Arms symbolized the new Corps' genealogy. The lightning flash and the gear wheel symbolized electrical and mechanical power, respectively.[8]

In June 1949, a second RCEME badge was struck and adopted 27 February 1950.[9] This badge was similar to the REME badge which had been adopted in 1947, and featured a horse forcene superimposed upon a lightning bolt, with a chain reflexed over its back and standing on a globe showing the Western Hemisphere. The horse and chain, symbolizing power under control, formed part of the logo of the Institute of Mechanical Engineers and, together with the lightning flash of electrical engineering, was intended to mark the close relationship between these branches of engineering.[10] It is interesting to add that during early 1949, rumours were rampant that Canada would adopt the REME badge. Consequently, some enterprising members, including Craftsman R.J. Hall of 212 Workshop in Shilo, photographed a REME badge and then hand carved and painted a 36-inch by 21-inch replica of the badge but with RCEME replacing REME. This was probably the first of that type of RCEME badge made.

In 1952, on the ascension of Queen Elizabeth II, the badge's Tudor Crown was replaced by the St Edward's Crown, the "Queen's Crown," which became the third RCEME badge.

The LORE badge was authorized in November 1973, but not available for general issue until 1975. It was an azure oval on which are superimposed a triangular rotor, crossed cannons, and a five-segment lightning flash, the whole surrounded by a wreath of ten maple leaves and surmounted by the St Edward's Crown. As described in CANFORGEN 017/75 (dated 22 July 1975), the lightning flash, the crossed gun barrels and the triangular rotor depict work in the electrical/electronics, weapons and vehicle fields

6. Sherman, Col N.C.; *The History of the Corps*; RCEME Conference, 1944, page 9.
7. *RCOC Standing Orders*; 1965, page 14.
8. *Notes for RCEME officers*; Queen's Printer, 1963, page 10.
9. *History of the Corps of RCEME*; draft paper, December 1967, page 18.
10. *Craftsmen of the Army*; Leo Cooper Ltd, London, 1970, page 162.

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respectively.[11] In addition, the triangular rotor is the symbol of the Society of Automotive Engineering (SAE). The ten leaves of the wreath represent the provinces. The Crown is the symbol of our Queen and, like the wreath, which symbolizes service, is a feature which the LORE badge shares with most of the post-unification branch badges in the Canadian Forces

The LORE badge was designed by Colonel W.J. Owens. It was selected for approval by the first DGLEM, Brigadier-General A.M. Reid, who wanted a badge linked with modern technology and, at the same time, representing the close connections LORE had with industry, as well as military and civilian institutions of Canada and other countries. The badge came into general issue in June 1975 and the collar badges the following year.[11] The collar badge, which comprised the central three symbols, i.e. rotor, cannons and lightning flash, became the recognized symbol of the Branch.

To give the introduction of the new badge suitable recognition, LORE units in many locations held formal rebadging parades. One of the largest of these took place in the Hohenfels Training Area in Germany, during the 4 CMBG autumn concentration in 1975. During this parade the bulk of the LORE officers and tradesmen in the brigade group were re-badged under the watchful eye of Brigadier-General C.H. Belzile, the Brigade Commander, as well as the COs and RSMs of the brigade units and contingents of maintainers from REME, the German Army and the US Army. General Belzile personally presented the LORE badge to one representative of every rank on parade from corporal to lieutenant-colonel (due to manning policies prohibiting LORE tradesmen below TL5 serving in Europe, there were no LORE privates on parade!).

The current EME badge was approved in 1990 and was based on the 1952 RCEME badge. The new design had some small improvements in the proportions of the horse, particularly the head. The fleur de lys on the collar were changed to maple leaves to better represent Canada. The banner is now bilingual with "EME" on the left and "GEM" on the right. EME stands for Electrical and Mechanical Engineers. GEM stands for Génie Électrique et Mécanique. The badge was enthusiastically taken into use in a series of joyous parades in the spring of 1991. The first was at LETE on May 15th and the last was in Kuwait at the end of the month (see page 274).[12,13]

Other Accoutrements

Other accoutrements giving the Craftsman's uniform and blazer a distinctive identity include collar dogs, buttons, shoulder titles, shoulder flashes, lanyards, belt buckles, corps tie, and crest. Most of these have been based on the corps/branch name or badge and have changed accordingly.

The first shoulder flash was "R C E M E" over "CANADA." Some of these were hurriedly made and issued as the troops were preparing for the D-Day landings. Later, the shoulder flash had "R.C.E.M.E." only. After the war the full name of "Royal Canadian Electrical and Mechanical Engineers" in gold on dark blue was used on a properly-embroidered shoulder flash. This remained in use until the RCEME badge was taken out of use in 1974. From then until 1992, no shoulder flashes were worn. In the fall of that year, the current shoulder flash with "Electrical and Mechanical Engineers" and "Genie Électrique et Méchanique" was taken into use. Its colours and general appearance are intentionally same as its predecessor.

The wearing of a RCEME lanyard was at the discretion of local commanders, but uniformity was required within units. Officers and warrant officers (class 1) wore the lanyard on the left shoulder while the remaining ranks wore theirs on the right shoulder. Care had to be taken so that when the lanyard was worn the colours showing at the front were blue over gold over scarlet.[14]

The RCEME belt buckle was authorized for wear with the 1937 pattern web belt. The buckle was a curved brass plate on which was affixed a RCEME hat badge, gilt for officers and warrant officers Class 1 and issue badge for other ranks. Its successor was the EME belt buckle, which is cast bronze featuring the EME cap badge surrounded by the Branch motto, Arte et Marte. This belt buckle is intentionally similar to the REME belt buckle![15]

The corps tie in 1965 was royal blue with gold and scarlet strips descending from the left shoulder at

11. Canadian Forces Order CANFORGEN 017/75.
12. Special Rebadging issue of the EME Journal, Fall 1991.
13. MacLean, Capt H.D.; *UNIKOM 1991- The Black Lung tour*; unpublished article, 1991.
14. Corps Instructions of The Corps of Royal Canadian Electrical and Mechanical Engineers.
15. Author's Note: The REME stable belt and buckle was a popular item for RCEME soldiers serving in Germany in the early 1960s and was `unofficially sanctioned' for local wear there.

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45°. It was authorized for wear by all ranks and was similar to the REME tie. The RCEME Association uses this pattern today for its tie and adds a hat badge in the upper centre. In 1965 a new officers' tie was authorized. It was royal blue with alternating rows of RCEME collar dogs in gold and scarlet maple leaves.

After the LORE badge was taken into wear a new branch tie was authorized. It was LORE midnight blue with LORE badges in gold. After the badge change in 1991 it was suggested that the new Branch tie be like the former RCEME officers' tie. This was proposed by Colonel J.A. Boucher and accepted at a meeting of LEME Senate in late 1991.

Colours

The colours chosen for RCEME on its formation in 1944 were blue, yellow and red. It is believed that these colours were derived from the three Corps which contributed mainly to the formation of RCEME, i.e. blue for RCOC, yellow for RCASC and red for RCE.[16] Because these three Canadian corps also had their British counterparts, the RCEME colours became, not unintentionally, the same as the REME colours. In December 1955 the colours were redesignated to be royal blue, gold and scarlet.[17]

During the implementation of Phase 2 RCEME, which began in 1951, tradesmen from other corps - such as RCA and RCAC - joined RCEME, as did the remaining vehicle mechanics of the RCASC. On the unification of the Forces in 1968, many members of the RCAF (MSE), as well as some members of the RCN and other army corps, joined LORE. With the exception of the light blue of the RCAF, some or all of the colours of these former corps or services were found in the blue, yellow or red of the original RCEME colours. Since RCEME and RCAF were the major source of LORE personnel in 1968, the LORE colours were chosen in order of precedence to be: dark blue, yellow, red, and light blue. The technical description of these colours is in Munsell Notation.[18]

Flag

During 1943, the RCOC(E) organization in First Canadian Army was changed to match the new REME organization in the British Army. Consequently, in RO 3860 dated 24 September 1943, the REME flag was authorized for use by the Canadian Army overseas. This flag was trisected vertically and the colours, commencing at the hoist, were blue, yellow and red. On the Canadian version, however, there was a small green maple leaf in the central division.[19] However, because of possible confusion with the French and Belgian flags, the design was changed in July 1946 to trisect horizontally with, from top to bottom, blue, yellow and red. Subsequently, the colours were redesignated royal blue, gold, and scarlet. The LORE flag following this precedent is quadrisected horizontally with, from top to bottom, royal blue, yellow, red, and light blue.[19]

The LORE flag was approved in early 1977 by the CDS. The first flag was presented to 202 Workshop Depot at a special parade on 3 June 1977, by the then Colonel Commandant, Colonel A.L. Maclean. This flag is now in the CFB Borden Museum.

Commemorative Monument

In 1962, the RCEME Gates were built at the entrance to the RCEME School in Kingston to serve as an inspiration for members and future members of the Corps. Thirty years later for this same reason a monument was built at the School in CFB Borden to commemorate 50 years of EME service to Canada's Armed Forces. It was unveiled by the Chief of the Defence Staff with the assistance of a veteran Craftsman and a young Craftsman[20] on 15 May 1994 as part of the EME 50th Anniversary National Weekend (see page 311).

The Commemorative Monument comprises a central block, a hexagonal base, two low walls, a time capsule, and a wide step. The central block is the main feature. On it are engraved the EME badge and a capsule EME history. The hexagonal base supports the central block. On it are engraved the four EME

16. Hamilton, LCol W.G.; *The Corps of RCEME - Historical Background*; unpublished; pages 4-6.
17. *Notes for RCEME officers*; Queen's Printer, 1963, page 8.
18. *DGLEM Letters*; published by DGLEM; Letter 10/77.
19. *Notes for RCEME officers*; Queen's Printer, 1963, page 8.
20. The veteran, LCol(Retd) J.K. Bradford, had joined the RCOC(E) reserve in 1936 and was the CREME (G4 Maint) of 1 Canadian Division for the Pachino landings in Italy 10 July 1943. The young Craftsman, Cfn S.E.W. Facey, had joined the EME Branch a few weeks earlier and was on his QL3 course at the time.

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trades badges, and a list of the campaigns and peacekeeping missions in which Canada's Craftsmen have served. The two low walls are on either side of the central block, and on them are engraved the names of the donors to the monument[21] and the four former hat badges.

The time capsule is behind the monument and contains various mementos of the past 50 years. The names of EME units which have contributed to the monument are engraved on the top. The wide step is at the front of the monument. On it are engraved "1944-1994" and the Branch motto *Arte et Marte*.

The Commemorative Monument symbolizes the Branch's history and the accomplishments of its members. The Branch history is symbolized by the hat badges and names of the corps and services which preceded EME. The accomplishments of its members are symbolized by the list of where they have served and by the mementos in the time capsule.

Perhaps most importantly, the EME 50th Anniversary Commemorative Monument symbolizes who Canada's Craftsmen are: the soldier-technicians of Canada's Armed Forces and the foundation of the EME Branch. Their four trade badges symbolize their status as the foundation of the Branch, while their motto symbolizes how they work; by skill and by fighting. The dates, 1944-1994, symbolize that they have been a separately-identifiable engineering branch for the past 50 years.

The EME Commemorative Monument was paid for by many of Canada's Craftsmen - regular, reserve, retired, friends, or families. Their contribution represents EME *esprit de corps*, camaraderie and, above all, satisfaction with a job well done. It was constructed at CFSEME to inspire tomorrow's Craftsmen in the hope that they will continue the traditions, history and quality of service established during the past 50 years - of which the Craftsmen of yesterday and today are so very proud.

Patron Saint

The EME Branch Patron Saint is St-Jean de Brébeuf. He was born in Normandy, France in 1593 and came to Canada in 1625 as one of the first Jesuit missionaries to the indians. He worked with the Hurons in villages in the area where CFB Borden is now located. In 1649 he was captured by the Iroquois in a raid and was tortured and died. He was canonized in 1930 by Pope Pius XI.[22]

St-Jean de Brébeuf was a skilled linguist who also knew some military engineering. He had a hand in building the fortifications and waterworks of Ste-Marie among the Hurons where his remains now rest. He was a true soldier of Christ whose life revealed rare high qualities of leadership such as courage, integrity, dedication, loyalty and compassion for his flock. In 1989 he was named the EME Branch Patron Saint.[23]

That year, the vehicle platoon of the maintenance company in 5 Service Battalion decided to make a contribution to the battalion's museum. Warrant Officer J.R. Barbeau suggested a picture of St-Jean de Brébeuf. "We collected some money and started our search for a picture in Québec city. We were lucky," recalled Captain N. Eldaoud, "and soon found an old priest who had a collection of old original paintings of Saints. One was of St-Jean de Brébeuf. The priest gave us permission to make copies of the picture, which we did. Today, one is in the battalion's museum and another at the School."[24] A third copy was unveiled at the Air Defence Artillery School in December 1991.[25]

RCEME Prayer

During World War Two, a padre with a RCEME unit somewhere in France wrote the following prayer, " God of power and might, Whose all-pervading energy is the strength of nature and man; inspire, we pray Thee, we Thy servants of the Corps of Royal Canadian Electrical And Mechanical Engineers with a quickening spirit of goodwill, that as honest craftsmen, seeking only the good of all in peace or war we may glorify Thee both in the work of our hands and the example of our fellowship, through Jesus Christ our Lord. Amen."

This prayer evokes concisely and simply the spirit in which the EME Branch approaches its work. The prayer is used on Branch occasions, particularly at memorial services at the RCEME Gates.[26]

21. In some cases, donors have asked that instead of their name, the name of a person they wish to honour be engraved.
22. *A Patron Saint for the LEME Branch*; EME Journal, Summer 1989, page 4.
23. Hanson, BGen J.I.; *The Selection of Our Patron Saint*; 50 Years of Canadian Electrical and Mechanical Engineering, page 71.
24. Eldaoud, Capt N.; taped interview, 1994.
25. Price, Lt D.M.; *St-Jean de Brébeuf - unveiled*; EME Journal, Fall 93, page 38.
26. RCEME Technical Bulletin, Vol 5, no 1, Feb 1960, page 1.

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March

Prior to 1944, Canada's craftsmen marched to *The Village Blacksmith*, which was the RCOC March.[27] On its formation in 1944, RCEME adopted the REME march, which was a combination of *Lillibulero* and *Heigh Ho, Heigh Ho*©.[28] *Lillibulero* had been selected because, as pointed out by Major-General Sir Bertram Rowcroft, the first DEME of REME, it was a rollicking aggressive tune which would help the fighting outlook of the new Corps.[29]

The tune is an old Irish one and there are several versions for the words. Those used by the EME Branch are found in the *Canadian Song Book*[30] and were written during the Irish Revolution of 1688. They were adopted as a marching song by the Duke of Marlborough's troops, who used it all through the War of the Spanish Succession.

The tune of *Lillibulero* is spirited and appealed to the fighting activities of the new Corps. However, it fell to Major-General A.R. Valan, the first Colonel Commandant of REME, to think of *Heigh Ho, Heigh Ho*© from Walt Disney's *Snow White and the Seven Dwarfs*©[31] to appeal to the working activities of the corps. The two tunes were amalgamated into a suitable march. *Heigh Ho, Heigh Ho*©, however, was difficult to integrate with *Lillibulero*. It was hard to hold step during the change of time from one tune to the other, and it was not particularly popular with the craftsmen.

Therefore, in early 1950, Captain D.G. Plater, first Director of Music of REME, suggested that *Auprès de ma Blonde* replace *Heigh Ho, Heigh Ho*©. This old French marching song had been used by the French army, England's opponent during the War of the Spanish Succession, and later the Seven Years' War. Still a very popular song, particularly with singing groups, it was composed in 1674 at the time that the Dutch Fleet was attacking Noirmoutier, which would explain why the husband of the beautiful girl is a prisoner in Holland. The tune fitted well with *Lillibulero* so a new march was composed by Captain Plater and adopted in October 1951. It was later amended in 1959 to overcome difficulties in holding step through the change of tunes. Two bars were cut from the bridge between the two tunes and the march as we know it today came into being and is the official REME March.

The REME March has long been used as the March for the Corps of RCEME. The current version comprises 32 bars of *Lillibulero* and 40 bars of *Auprès de ma Blonde*. In 1976 the Central Forces Band made a special recording of it and the Logistics Branch March as background for the film *Camp Roofless*, which tells the story of the Canadian deployment into the Golan Heights in 1974.[32] This is considered the first official use of the REME March as the LORE (now EME) March.

The REME March has special significance for Canada. Its two marching songs, one from each of the two armies that fought at Québec, have become entwined in one march past. (The words are at Appendix 4.) This caused a problem though when it came to the shortened "dinner" version often played at functions such as mess dinners. The dinner version of the REME March only has a couple of bars of the chorus of *Auprès de ma Blonde*. Therefore, in 1993 Lieutenant-Colonel G.W. Klassen, the Supervisor of Music of the Canadian Armed Forces, authorized a version which distributed the music more evenly between the two tunes. He had it recorded by the Central Forces Band for use in the Canadian Forces.[33] Today when this "dinner" version of the REME March is played at Canadian mess dinners EME participants, especially the younger ones, often rousingly sing along. In so doing they demonstrate the Branch's strong *esprit de corps*, which is one of the objectives of a regimental march.

Slow March. At a DGLEM mess dinner in the spring of 1983 Brigadier-General J.R. Doucet announced that *Flower of Scotland* had been approved as the LORE Branch slow March.

Birthday

There are many dates which have significance and which could have been selected as the EME Branch birthday. On 1 October 1942 the British grouped the bulk of the electrical and mechanical

27. RCOC Standing orders, page 19.
28. The song *Heigh Ho, Heigh Ho* is copyrighted by the Walt Disney Corporation.
29. RCEME Technical Bulletin 9/1, page 25.
30. MacMillan, Sir Earnst, editor; *A Canadian Song Book*; 2nd edition, Dent & Sons, Toronto, 1929.
31. *Snow White and the Seven Dwarfs* is copyrighted by the Walt Disney Corporation.
32. *Camp Roofless*; DND film, 1976.
33. Klassen, LCol G.W.; NDHQ letter, file # 5050-7 dated August 16, 1992.

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engineering soldiers of their army into a new corps called REME. On 11 January 1943, the Canadian Army reorganized by forming a similar group in the engineering side of RCOC(E). Finally, after much pressure, a new corps of Canadian Electrical and Mechanical Engineers was authorized on 24 February 1944, with effect dated to 1 February 1944. The designation "Royal" was granted on 20 April 1944. However, the formal transfer of units to RCEME was not made until 15 May 1944 and this date has become the official birthday of the Corps. On 13 April 1953 the Corps was redesignated The Corps of RCEME. However, by this time the Corps birthday had been well established as May 15.

This date remained as the Branch birthday until the autumn of 1976 when the LORE Senate selected 1 June as LORE Day. In making their selection the Senate had several choices of dates, none of which was both significant and, more importantly, suitable for holding a celebration. For example, 1 February, the actual date of the formation of LORE, is not suitable for holding the large-scale sporting and social events and parades that made 15 May so popular. Therefore, the choice was narrowed to finding a suitable weekend after Victoria Day and St-Jean Baptiste Day and before Canada Day. Consequently, the weekend around 1 June was selected as LORE Day as that had been the day most units had rebadged in 1975.

RCEME units made a tradition of celebrating the Corps birthday as the highlight of the year's activities. The celebration of the fifth birthday at the RCEME School in 1949 was noted as one of the largest parties held by an army unit in Kingston up to that time. Three companies were on parade and trophies were presented for bowling, cross-country running and marksmanship. The recruit soldiers demonstrated precision drill under the tutelage of Sergeant R.S. Brennan while the bugle band, under Sergeant W.E. Hendon, turned in a fine performance. A reception at the officers' mess, steak dinner in the men's mess and an all ranks' dance in the drill hall concluded the day.

The 21st birthday of RCEME was celebrated in fine style by 4 Field Workshop in Soest, Germany. The celebrations commenced on Sunday, May 9, with a church parade and presentation of stained glass windows to each of the Fort Chambly Chapels. On Wednesday, the workshop paraded nearly 200-strong under the command of the CO, Major P. Bateson, for the inspecting officer, Major-General L.G.C. Lilley, the Comptroller General of the Canadian Army. After the inspection, the workshop marched past in column of route, followed by a drive past of all 112 vehicles of the unit, including the two tank transporters (the Mighty Mouse and the AutoCar). This was followed by receptions in the various messes, after which there was an open house. Guests included the Brigade Commander, Brigadier A.J. Tedlie, and the DEME, Colonel A. Mendelsohn. That evening there was an all ranks' ball for the unit at Werl attended by 500 people. A highlight of the evening was the draw for a Volkswagen car. (The idea of the car draw was Captain N.A.G. Graham's. He would use that idea 30 years later when, as President of the LEME Association, he introduced the concept to the planners for the EME 50th Anniversary celebrations (see page 309). Canada's Craftsmen had come of age!

RCEME personnel have taken their Corps birthday tradition with them wherever they have gone. In 1963 the ten RCEME officers and their wives in England met at the home of Lieutenant-Colonel A.G.M. Maitland to celebrate the event with an evening house party highlighted by the cutting of a cake. At the same time, but a thousand miles further east, the 150 RCEME personnel in 56 Infantry Workshop at Rafah under the command of Major D.J. Tidy celebrated the corps birthday with the 16-member CBC concert party. The events started with a parade of "outlandish" vehicles through the Canadian base camp. Then there were sporting events including a tug-of-war. The evening closed with a concert, during which the entertainers sang happy birthday to RCEME. At this time, the forty RCEME personnel in Cyprus under Major C.A. Millar celebrated the Corps birthday with a softball tournament and a dinner at a local restaurant.

The Army Aircraft Maintenance Wing at Rivers, Manitoba, regularly had a Corps birthday celebration too. But the cake was usually cut with an unusual knife, a CH112 helicopter tail rotor blade!

Even after the formation of LORE the RCEME birthday was celebrated on 15 May. The eleven LORE members in Vietnam in 1973 celebrated the birthday with a dinner in a restaurant in Saigon. "The food was delicious, the birthday cake superb, the wine abundant but, alas," as Colonel M.C. Johnston noted, "their French connection was too strong for the Irish coffee because the band could only play *Auprès de ma Blonde*!"

A major celebration took place on RCEME's 30th birthday, 15 May 1974, in the field during the 1 CBG Wainwright concentration. The affair was hosted by Maintenance Company 1 Service Battalion, and all

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ranks RCEME and LORE of the brigade group were invited. Although some unit LORE personnel were unable to attend because of training commitments, virtually every unit in the brigade was represented, together with a contingent from the Wainwright Maintenance Section. The evening was marked by such typical activities as a tug-of-war and craftsman's greased pole climb. It climaxed with the presentation of a RCEME plaque to Captain J.R. Kaye, the Wainwright Maintenance Officer and a founding member of RCEME, to mark his pending retirement. The Fritsche shelter and Herman Nelson heater of vehicle platoon provided a bit of relief from the cold Alberta spring night.

When June 1st was established as LORE Day, the tradition continued. On 3 June 1977, LORE Day was celebrated by 202 Workshop Depot with an open house, parade and reception for about 1,500 members, families and invited guests. Events such as this helped perpetuate the tradition of the corps birthday.

Since the redesignation of the Branch to the EME Branch, the Branch birthday is once again May 15th. This was emphasized during the EME 50th Anniversary celebrations which on that day focused on several regional celebrations and the 50th Anniversary National Weekend at the Branch's home station, the Canadian Forces School of Electrical and Mechanical Engineering (CFSEME) in CFB Borden.

Two celebrations in 1994 aptly showed the EME spirit "at the front." Both occurred in beleaguered Visoko, Bosnia-Herzegovina. At that time the fighting in and around the town had virtually isolated the 12e Régiment Blindé. Nevertheless the regiment's maintenance troop held the "Olympics of Visoko" just before leaving to come home in April as Captain M. Sanchez recalled. "We organized some indoor games using what we had in our workshop area. A feature was the ceremonial lighting of the Olympic, i.e. EME, flame with a torch!" A month later the maintenance troop of the Strathcona's Horse (Royal Canadians) held an informal get together in the same workshop and grouped together for a troop photograph.

"The 51st EME Birthday in Haiti was celebrated Caribbean-beach style by the 20-person UNMIH maintenance platoon," noted Master-Corporal R. Pettit. "The day's events featured a day-long beach party followed by a barbecue and cake cutting."[34] The EME spirit continues to thrive!

Trophies

There are many trophies or memorials owned by individuals, units or the Branch. Some are mementos of individual events, while others commemorate campaigns or former craftsmen or are gifts from affiliated corps. There are six, however - the 9.6 inch RML gun, the Rose Bowl, Sadie, the REME/LEME Talismen, the REME Alms Dish, and the RAEME Serving Tray - which were presented to and are owned by the Branch. A seventh, the RCEME Lances, are in the Officers Mess in CFB Kingston. Militia service battalions used to compete for the **William Lennox Thompson Trophy** (now displayed in the EME Museum at CFB Borden).

The 9.6 inch Rifled Muzzle Loading (RML) Gun. The RML gun was started by Lieutenant-Colonel S.J. Montgomery who was a former NPAM OME 3rd Class and a Professor at Nova Scotia Technical College. He had spent 4,000 hours working on the gun in the machine shop of the College over a period of 30 years. A perfectionist, he took the measurements for the gun from one of the original RML guns at Seaward Defences in Halifax.[35] The original guns are a most interesting example of design thinking during the transition stage between muzzle-loading and breech-loading armaments. Constructed between 1860 and 1868, they actually replaced breech-loading guns. Remaining in service until just before World War 1, they fired a 250-pound shell capable of defeating ten inches of wrought iron at 1,000 yards. The maximum range was about 8,000 yards.

The model gun is an exact 1:20 scale right down to the Whitworth threads on the bolts, which were hand-turned by Colonel Montgomery. The wooden portions were formed from a piece of lignum vitae which came from the steps of one of the original guns. The barrel, as in the original, was made up of shrunken bands.

The DME, Colonel C.R. Boehm, visited Halifax in the spring of 1950. While viewing some trade test projects Colonel Montgomery remarked that he would like to show the DME a real trade test and showed him the gun. Later he offered it to Colonel Boehm as a gift to the Corps. The offer was accepted and 200 Base Workshop RCEME was tasked to finish off and assemble the gun. That was done as a special project in

34. Pettit, Cpl R.; *Maintenance Platoon CCUNMIH, Port au Prince, Haiti*; article, 1995.
35. Maitland, LCol A.G.M.; taped interview, 1977.

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the armourer's shop in the charge of Lieutenant D.H. Fraser. On completion, the gun was sent to the RCEME School, where it graced the Officers' Mess in Barriefield for many years. It now has the place of honour at the entrance to the officers' mess at the School in Borden. During 1994, as part of the 50th Anniversary celebrations, the gun was displayed in the citadel in Halifax.

The Rose Bowl. A sterling silver rose bowl, the Rose Bowl was presented to the Corps on 18 March 1964 by General, The Honourable, A.G.L. McNaughton on his retirement after eighteen years of direct association with RCEME. The presentation "in commemoration of the first two decades of the Corps of RCEME and to express faith and confidence in the continued service of the Corps to Canada" was at a special mess dinner honouring his retirement. In making the gift General McNaughton showed much foresight. He envisaged the termination of RCEME and its succession by some other, at that time, unknown group. The trustee for the gift to the Corps was the RCEME CA(R) Corps Officers' Fund. The LORE Branch Officers' Fund was named as the successor to that fund in order to legally perpetuate this trust.

An interesting sidelight to the presentation of the Rose Bowl is the special illuminated scroll outlining the terms under which the gift was made. This scroll was designed and executed by Sergeant J.P. Champagne, a RCEME radio technician and a superb artist. He had worked from 1948 to 1957 lettering and illuminating the pages of the World War Two Book of Remembrance located in the Memorial Chamber under the Peace Tower, Ottawa.[36]

Sadie. She stood at the entrance of the White House, the RCEME School Headquarters, for many years. Her wistful smile and Canadian Army helmet were as incongruous as they were curious, and many a recruit soldier or neophyte officer asked about her origin. She was liberated from her garden near Lanciano, Italy, in December 1943 by Major C. Martin and became the mascot of 1 Canadian Infantry Troops Workshop. Outfitted with a tin hat and armed with a musket and bayonet, she was always on guard duty outside the workshop's receipt and issue tent. She became well known throughout 1 Canadian Corps as well as her unit's symbol. She was shipped home from her unit, then at Arnhem, Holland in September 1945, to her new home in Barriefield, where she guarded the White House door.[37]

The details of her liberation, however, were not recorded at the time and an aura of mystery gradually grew up about her. Again she became a mascot. As the years rolled by, there being a need to instill RCEME lore into new soldiers, she became a symbol of those days in Europe when RCEME was born and won its spurs in the crucible of war. Sadie now guards the entrance to CFSEME Headquarters in CFB Borden.

The REME and LEME Talismen. Representing an exchange of mementos between the two corps on the occasion of the 50th Anniversary of REME in 1992, the REME Talisman are a pair of caducei[38] made by 14 (Berlin) Field Workshop.[39] One was made of nickel silver for presentation to the EME Branch. The other, made of mahogany and brass, was carried across Canada as part of the exercise and then returned to Arborfield. The EME Talismen are two replicas of Champlain's Astrolabe,[40] and were made by 202 Workshop Depot with the permission of the Canadian Museum of Civilization.[41,42]

The exchange took place in St-John's, Newfoundland as part of Exercise Master Craftsman. The REME and LEME talismen destined for REME accompanied Exercise Master Craftsman to the UK and were presented to REME there (see page 307). They are now in the REME Museum in Arborfield. The two destined for the EME Branch are now at CFSEME in CFB Borden.

The REME Alms Dish. An alms dish is a traditional gift associated with the act of giving. To mark the 50th Anniversary of REME's allied Corps, the EME Branch, Brigadier J. Graham, ADC, representing all ranks of the Corps of REME, presented the EME Branch with a silver Elizabethan alms dish suitably engraved by a former REME tradesman.[43] The dish displays the two corps' badges, which are similar, and

36. RCEME Technical Bulletin 9/2, page 2.
37. RCEME Technical Bulletin 8/2, page 29.
38. A scroll carrier used by messenger of ancient Rome.
39. The workshop made two others. One was given to the Burgermeister of Spandau where the workshop was located and the other is competed for annually in the REME Corps Regatta.
40. An astrolabe is an ancient navigation device for calculating latitude. Champlain lost his astrolabe in 1613 while travelling up the Ottawa Valley. It was found near Pembroke, Ontario in 1867 and eventually was purchased by the Government of Canada for display in the Canadian Museum of Civilization.
41. *Exercise Master Craftsman 1992*; Corps of REME, 1993, pages 11 and 12.
42. Peters, Maj A., (REME); *Champlain's Astrolabe*; EME Journal 1/95, page 21.
43. *Canadian LEME Celebrates 50 Years*; The Craftsman, Volume 50, Number 8, page 343.

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their shared motto - *Arte et Marte* - reflecting the strong continuing affiliation between them.

The RAEME Tray. A silver serving tray, it was presented to the EME Branch on the occasion of EME's 50th Anniversary by all members of one of its sister corps, The Corps of Royal Australian Electrical and Mechanical Engineers.

The RCEME Lances. Once gracing the entrance of the RCEME School officers' mess, the RCEME Lances were originally part of the equipment of the RCEME Band.[44] They are now mounted in the Base Officers' Mess with the following inscription: "For 30 years, 1940 to 1970, Canada's Craftsmen, the officers, artificers, mechanics, technicians and recruits of the Royal Canadian Ordnance Corps (Engineering) and the Corps of Royal Canadian Electrical and Mechanical Engineers trained at Barriefield. The school here, initially called the Canadian Ordnance Training Centre, was renamed several times including A21 Canadian Ordnance Corps Training Centre, the RCEME School, and Canadian Forces School of Communication and Land Ordnance Engineering. The 40,000 craftsmen trained at Barriefield amassed a proud record repairing, recovering, designing, and manufacturing equipment in war under fire and during peacetime. Barriefield gave them a special camaraderie which they will always cherish."

Awards

The award which has come to represent the Branch is the EME Branch Advisor's (formerly the DGLEM) Award. Other awards which represent the aims of the Branch, but are/were awarded locally include the Benoit Trophy.

EME Branch Advisor's Award. The DGLEM Award was instituted in 1973 as means of recognizing achievements that are exceptional and outstanding in nature, have contributed significantly to any aspect of EME Branch activities, and have not been adequately recognized by other incentive awards.[45] Initially the DGLEM selected the winner informally, but by the mid-1980s selection criteria had been formalized, so that the award could reach all areas of Branch activity.

The first winner was Lieutenant-Colonel W.J. Owens for his contribution to the formation and the future of the Branch. The Land Engineering and Test Establishment received the 1993 award for its contribution in support of the United Nations operations in the former Yugoslavia. This was the last time that it was awarded as the DGLEM Award. In 1994 the name was changed to EME Branch Advisor's Award to better reflect the truly branch-wide scope of the award.

The 1995 winner of the EME Branch Advisor's Award was the maintenance troop of A Squadron 8th Canadian Hussars (Princess Louise's) for continuously providing outstanding support to the regiment and the Combat Training Centre in the execution of its national training mandate. This was the first time that the award was won on the basis of a unit nominating its own EME subunit.[46] The list of recipients of the award, and their contributions, reveals how the efforts of members of the EME Branch touch all aspects of Canadian Forces activities (see Appendix 8). A plaque listing the recipients is located outside of DGLEPM's office.

Benoit Trophy. The Corporal Glen Benoit Memorial Award was donated by all ranks of the Royal Canadian Dragoons in memory of Corporal Benoit, a FCS Technician, who was killed while working on a Leopard C1 tank in 1985. The prize recognized the most deserving Craftsman/Corporal in CFE on the basis of performance, personal conduct, dress and deportment, physical fitness and community participation.[47] The prize was awarded annually until 1994 when, on the closure of CFE, the trophy was returned to the regiment.

RSM's Cane {In the 16th century as weaponry changed, the sergeants of infantry replaced their spears and bows with the halberd; a pike-like weapon on a long wooden shaft that was effective against cavalry. By the 17th century, use of the halberd became less aggressive and it was used to align the ranks of soldiers armed with muskets. The proper alignment of soldiers was important, as it prevented soldiers from shooting at the backs of those in front. (Visualize the "squares" at the Battle of Waterloo). Eventually the halberd was replaced by a long wooden stick. At the time soldiers practised battlefield movements in open fields, and the pacing of marching was important in retaining correct alignment of soldiers. The long wooden

44. Author's Note: It was inspiring for a young officer-cadet to see the lances being ceremoniously removed and returned to their cases by the Band's Drum-Major. The care and attention he gave to the ceremony was all part of our introduction to RCEME *esprit de corps*.

45. Terms of Reference *EME Branch Advisor Merit Award*; unpublished DND/DGLEPM paper, 1995.

46. Crouse, Ms T.; *Top Maintenance award goes to a Squadron 8CH*; Oromocto-Gagetown Post-Gazette, November 1995.

47. *LEME day in CFE - 1989*; EME Journal, Winter 1990, page 13.

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stick became a pacing stick that was similar to a large mathematical compass. All senior non-commissioned officers carried them.}

Then, in order to identify the regimental-sergeant-major (RSM), a special cane was made and was decorated with the regimental badge and the names of previous RSMs. Other senior non-commissioned officers continued to carry a pace stick. Today the RSM's cane represents his position and responsibilities, and a special ceremony accompanies the change of RSM. On parade in front of the members of the regiment, the outgoing RSM passes his cane to the commanding officer who in turn passes it to the new RSM.[48]

The EME Branch Chief Warrant Officer's Cane, the CFSEME RSM's Cane and the RSM's Cane of Service Battalions are examples of RSM's Canes. The first Branch Chief Warrant Officer's Cane was taken in to use in 1976 when Chief Warrant Officer L.J. George was Branch Chief Warrant Officer. It featured the LORE Badge, and remained in use until the rebadging ceremonies in 1991. It is on display in Ottawa in the Branch Advisor's office area. The second cane, which features the horse badge, was taken into use during those rebadging ceremonies and was first used by Chief Warrant Officer R.E. Roy.

The CFSEME RSM's Cane was taken into use in 1946 by Warrant Officer (Class 1) W.G. Collins, the first RSM of the RCEME School. It has been in continuous use ever since and reflects all of the School's names and RSMs.[49] Sometime after the first Horse Badge was taken into use by the Corps of RCEME, a replica of that badge was affixed to the top of the cane. It is still there as a proud reminder of the Corps' and the Branch's proud history.

When the Canadian Contingent Service Group (CCSG) was formed in the former Yugoslavia in late 1992 it had an RSM. Chief Warrant Officer B. Dionne, the RSM in 1993, had a special CCSG RSM's cane made up by tradesmen in 5e bataillon du service. This was presented to the CCSG and used by the RSM. The tradition continues.

Freedom of the City

One of the most distinctive honours that can be conferred on a regiment is the privilege of the Freedom of the City it serves - a privilege granted in perpetuity permitting the regiment to march through the city with drums beating, flags flying, and bayonets fixed. This honour was conferred on the Corps of Royal Canadian Electrical and Mechanical Engineers, its predecessors and its successors (i.e. from RCOC(E) through to EME) at a ceremony in front of Kingston's City Hall on 3 June 1994 (see page 311).

The Freedom of the City is normally only conferred on units. However, since EME (and, before it, RCEME) workshops and maintenance troops/platoons are everywhere Canadian Forces serve, the EME Branch is in effect a regiment of very many, very small units - everywhere - and the School is the only place where there is a large group of them. So it is natural that the Freedom of the City should be conferred on the Corps/Branch by Kingston.

In presenting a scroll commemorating the event to the Mayor of the City of Kingston, Colonel M.C. Johnston, the EME Colonel Commandant, noted that there had been electrical and mechanical soldier-technicians in Kingston since the end of World War One. Before World War Two they served in the Kingston garrison as members of the Engineering Branch of the Royal Canadian Ordnance Corps. At the start of World War Two, Ordnance training was started on the hill at Barriefield where in 1946 the RCEME School was opened. Since 1970, when the School was moved to Camp Borden, EME soldiers have continued to serve as part of the garrison.

The ceremonial parade for the occasion had four guards representing the past, present and future.

48. Grenier, CWO N.; *Le Mot du SMR*; Reflexion - le Bulletin mensuel du 202e Dépot d'Ateliers, 1994.

49. The exception is Warrant Officer (Class 1) W. Buckle who was a member of the Royal Canadian Regiment while serving as RSM of CFSAOE.

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Memorials

The Branch Memorial, Memorials in Europe, The EME Branch Honour Roll, DVA Commemorative Tours, Names of EME Buildings

The Branch Memorial - the RCEME Gates

The RCEME Memorial Gates[50] originated as part of a master plan for the RCEME School in 1950. A competition was announced but no winners were declared. The Corps Association then stepped in (see page 289) and helped. The gates cost nearly $9,000 to build. Funds came from members and former members of RCEME, regular and militia, officers and other ranks as well as families and friends.

The gates were built at the entrance to the RCEME School and were dedicated to the "memory of all ranks of the Corps of Royal Canadian Electrical and Mechanical Engineers who died in the service of Canada" in October 1961 by General A.G.L. McNaughton, the Honorary Colonel Commandant.[51] The gates were later extended, and re-rededicated by the Commandant of the School, Colonel A.L. Maclean, on 12 May 1968 as part of the ceremonies marking the Corps twenty-fourth birthday.

Having the RCEME Gates at the RCEME School brought their message of commemoration to the attention of new generations of Craftsmen. This advantage was lost in 1970 when the School was moved to Borden. Every Remembrance Day, however, Base Maintenance Kingston and the RCEME Association jointly conduct memorial ceremonies at the RCEME Gates under the aegis of the Base Commander Kingston.

On November 11th, 1991 the Colonel Commandant, Colonel M.C. Johnston, and the Branch Chief Warrant Officer, Chief Warrant Officer A.E. Rest, jointly laid a wreath on behalf of the LEME Branch at the Gates as part of the Remembrance Day ceremonies. At their recommendation the LEME Senate subsequently declared the RCEME gates to be the LEME Branch Memorial. At a stroke the memories of Craftsmen from all eras from RCOC through to LEME had been melded into one memorial.

At the same time action was started to move a 25-pounder gun from Borden to Kingston and have it mounted on the west side of the entrance opposite the Sherman tank. This was done and the gun was temporarily installed for the Remembrance Day services in 1992. The entire LEME Senate attended this service.

The gun was lovingly refurbished by the base maintenance section of CFB Kingston. Several parts, e.g. the muzzle brake, were chrome plated. The gun layers' seats are aluminum. These "modifications" enhanced the look of the gun and minimize the future maintenance effort required.

The gun wears the tactical signs of the 13th Field Regiment, RCA, which, as part of 3 Canadian Infantry Division, landed in Normandy on D-Day in the first assault wave. There are two tactical signs, one on the upper left of the shield and the other on the upper right. Each sign is 9½" wide and 8½" high. Details are: upper left - bisected horizontally red over blue (the field artillery tactical sign) surmounted by a white 43 (the regiment's number); upper right - French grey (the division's colour).

Prior to using these signs, the Colonel Commandant secured the permission of the commanding officer of the regiment at the time of the D-Day landings, Lieutenant-Colonel F. Clifford, and the concurrence of the Regiment's LAD officer just prior to the landings, and one who landed with the first assault waves, Captain A. Mendelsohn. The inscription on the plaque reads: "25-pounder guns were the standard field artillery guns when RCEME was formed on May 15, 1944. For many years this gun was used in the training of Craftsmen at the RCEME School here in Barriefield, Ontario. It wears the tactical signs of 13th Field Regiment, RCA, which used 25-pounder guns during World War Two."

It is interesting to note that this gun was one of two which were used for many years at the armament company of the RCEME School as training aids for the training of gun mechanics and officer-cadets. Both guns were moved to Borden with the School in the early 1970s. Later, when the 25-pounder was taken out of service and no longer used, one of the guns was placed in Worthington Park in CFB Borden. The other languished behind the range shack until rescued and returned to Kingston to be mounted at the RCEME Memorial Gates. What a fitting end for a gun on which many of Canada's Craftsmen trained!

The Base Commander was so impressed with what the Branch had done with the Gates that he

50. Johnston, Col M.C.; miscellaneous articles; published from 1978 to 1994.
51. RCEME Technical Bulletin 11/3, page 2.

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declared the Gates an attention area. A Canadian flag now flies permanently over the gates. It is spotlighted at night. Troops are required to march to attention and salute when entering them. It is now a regimental memorial, on the same status as Vimy Ridge and regimental memorials of combat arms units.

The RCEME Association, the LEME Association, the LEME Officers' fund and the Chief Warrant Officers' Fund bought the flag pole placed to the left of and in front of the gatehouse. The Base Construction Engineering staff installed the gun, flag pole and lights. Base Maintenance has taken responsibility for the maintenance.

As Colonel Johnston has noted, "We now have a national Branch Memorial which gives a feeling of quiet dignity in memory of Canada's Craftsman from RCOC, RCOC(E), RCEME, LORE, and LEME who fell in war and during peacekeeping operations. Over and above this, what we have achieved at the Gates is the melding together of all eras of our Branch from RCOC to LEME. That's how regiments are made!"

Today at Remembrance Day ceremonies and during its annual reunion in June, the RCEME Association and representatives of widows and children lay wreaths in honour of members of the Corps and the Branch who made the supreme sacrifice.

Memorials in Europe

RCEME Badge on the Memorial Tank at Courseulles-sur-Mer (see also page 53). On D-Day, 6 June, 1944 as part of the Allied landing force, 3 Canadian Infantry Division landed at Juno Beach on a 20-kilometre section of the Normandy coast which included Courseulles-sur-Mer. The division's leading wave included the 1st Hussars which landed at Courseulles-sur-Mer. The unit was equipped with Duplex Drive (DD) Sherman tanks. Some of these tanks were sunk on the run-in. One of them, lying in the deep water in front of Courseulles, interfered with fishermen's nets. In the fall of 1970, at the request of the town's Mayor, this tank was pulled from the water by a recovery team from Maintenance Company of 4 Service Battalion and mounted in the town square. In 1984 it was dedicated "to the memory of all who participated in the operation."

Over the years replicas of the badges of the regiments involved in the landing were attached to the tank. Soon it was festooned with badges, but there was no RCEME badge. Therefore, in 1992 the RCEME Club in Vancouver had a 10-inch high replica of the original badge cast in bronze. In May, Lieutenant L. LaFrance and Corporals K. Osborne and R.J. Thompson from the maintenance company of 4 Service Battalion added this badge to the tank. On 2 June 1992, the Colonel Commandant, Colonel M.C. Johnston, and his wife, Joan, visited Normandy and dedicated the plaque to the memory of all of Canada's Craftsmen who participated in the Second World War.

Maintaining the tank is a continual problem. The paint weathers and, because the plaques on the hull are attached by brackets, screws or spot welding, they are easily and frequently removed. Therefore, it must be periodically refurbished. For the 40th anniversary of D-Day in 1984, it was cleaned up by a LEME crew from Lahr.

By 1994, the tank needed to be refurbished again. In addition, it had sagged over the years as its road wheels deteriorated. So "Team Bold," a small group of six of the remaining Craftsmen in Canadian Forces Europe, placed supporting jacks under the hull, painted it, added "tac signs", repaired plaques and added one, that of the 19th Canadian Army Field Regiment, RCA. They and the EME Branch watched with pride when the Prime Minister placed a wreath at the tank on 6 June, 1994 in memory of the Canadians who had fallen in the Normandy Campaign. The tank is not an "official" national memorial, but it is in the hearts of many veterans. The EME Branch's initiative and work had ensured the tank, in its newly refurbished livery, continues to be a proud memorial to the Canadian soldiers who stormed these beaches 50 years ago.

RCEME Memorial Windows. In 1965, 4 Field Workshop RCEME in Fort Chambly near Soest, Germany presented two stained glass windows, one to the Protestant chapel and one to the Roman Catholic chapel.[52,53,54] The windows were consecrated and dedicated to the memory of members of RCEME who gave

52. The windows were manufactured by Glasmalerei Peters of Paderborn at a cost of about DM 1,000 each and installed in the Canadian Army (St-Luke's Protestant and Holy Trinity Roman Catholic) chapels at Fort Chambly, Westfalia. The window in the Protestant Chapel, Christ with child in arm and children of different nationalities, was designed by Mr. Peters himself and was installed on the right side of the nave. The window in the Roman Catholic Chapel was designed by Duix of Dusseldorf and was one of a set of four that were installed in the chancel behind the alter.

53. *The EME National Celebration Weekend*; souvenir program; 1994.

54. *Repatriation of the RCEME Stained Glass Windows 15 May 1994*; souvenir program, 1994.

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their lives in the service of their country. The windows were produced locally and were designed by a Canadian who at the time was serving with the RCR in Germany. When the Canadians withdrew from Soest in 1969-70 the camps were taken over by the British Army of the Rhine. Fort Chambly became the home of a REME Workshop. The windows were well looked after. The camp was being closed in 1993, so the windows were removed and sent to Camp Borden where they were installed in the chapels and rededicated on May 15th, 1994 as part of the 50th Anniversary National weekend ceremonies (see page 311). The Colonel Commandant, Colonel M.C. Johnston, who as a captain had been the project officer for production in 1965, unveiled the window in the Protestant Chapel. The Branch Advisor, Brigadier-General V. Pergat, unveiled the window in the Roman Catholic Chapel.

This project is one in which the EME Branch can take pride. It was the Branch's initiative in asking to have the RCEME windows repatriated that was the catalyst in starting a much larger program in which all 70 memorial windows from Germany, France and Cyprus were repatriated. The project officer for this program was an EME officer, Major A.G. Hall. These windows are being installed in base and regimental chapels across the country.

Memorial plaque at Aldershot, England. On 6 July, 1940 German aeroplanes bombed 2 Army Field Workshop. Three members of the workshop were killed. They were the first Canadian Army casualties due to enemy action in World War Two. In 1969, the Branch Advisor, Brigadier-General A. Mendelsohn, unveiled this plaque in memory of these Craftsmen. The plaque was donated by Branch 466 of the Royal Canadian Legion of Toronto, the area from where the workshop was recruited at the outbreak of war. In October 1992, Colonel M.C. Johnston visited Aldershot and checked the plaque. It's just fine and well cared for.

Cornerstone for 1 Canadian Base Workshop, Camp Bordon, England. In 1942 the Royal Canadian Engineers constructed the buildings that were used by 1 Canadian Base Workshop (1CBW). This unit was Canada's first overseas workshop and became the largest military workshop in the British Empire. At its peak, 1 CBW workshop had a staff of 3,100. The cornerstone was laid by General A.G.L. McNaughton, at the time General Officer Commanding 1 Canadian Army, and later the first Colonel Commandant of RCEME. Today the buildings are still in use as training workshops for the School of Electrical and Mechanical Engineering (SEME) in Bordon.

In July 1945, a photograph of the members of 1 CBW was taken on the parade square in front of their barracks in Camp Bordon, England. In March 1992, nearly 50 years later, the members of SEME formed up and had their picture taken at the same place. To commemorate this special link, two mountings were made, each having a copy of the two pictures. Today one of these mountings hangs in the entrance of CFSEME in Camp Borden and the other in the officers' mess in Camp Bordon. Another link with our affiliated Corps, REME, is remembered!

The Tin Tabernacle, Camp Bordon, England. This is the site of the former Garrison Church of Saint George which provided a haven as well as a place of worship for the many Canadians in Bordon, England. Because Bordon was the location of 1 CBW, the Tin Tabernacle had a fond place in the memories many RCEME soldiers. However, it was torn down in the 1970s and a small park formed on the site. The Colonel Commandant, Colonel G.W. Bruce, unveiled a commemorative stone in the park in 1984. Colonel M.C. Johnston visited the park in 1992 and found it a quiet, well-maintained place.

RCEME Cairn at Fontaine Henry, Normandy, France. (see also page 54) An advanced element of 2nd Canadian Armoured Brigade Workshop landed in Normandy on D-Day. The element, in charge of Warrant Officer (Class 2) R. Maynard, was ashore by the late afternoon. The workshop's main body landed in Normandy the next day. For the next month it was located at Fontaine-Henry, a small village 8 kilometres south of Courseulles-sur-Mer, while the battle raged for Caen just 13 kilometres to the south-east. During this time the unit helped many families including the family of Guy Chrétien who was six years old at the time. Guy has always remembered this and has had a street in the town named Rue RCEME. He also has had an area in the town made into a park called Place des Canadiens. In the park he has placed a number of cairns each commemorating one of the units who passed by or were bivouacked in the village during the Normandy Campaign.

At his suggestion, 202 Workshop Depot designed and made a memorial plaque for the RCEME cairn. It was delivered to him by Major W.G. Hamilton, the 2IC CREME for 3rd Canadian Infantry Division

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during the Normandy campaign, and by Warrant Officer Maynard. Warrant Officer Maynard was one of the group that had helped Guy that summer of 1944. Fifty years later he was Guy's house guest!

In 1995 on the 50th Anniversary of VE-Day a special memorial garden was opened at the Mémorial: un musée pour la paix in Caen. The Mémorial teaches the lessons of the causes of World War Two and documents the liberation of Normandy. The memorial garden commemorates the Canadian contribution to that liberation and was funded by the Battle of Normandy Foundation, a registered Canadian charitable foundation. The garden includes a number of cairns on which are inscribed in English and in French the names of the Canadian units that participated in the Normandy campaign. One name that is included is the Corps of Royal Canadian Electrical and Mechanical Engineers.

RCEME Plaque at Giberville, Normandy, France. 1st Canadian Army Troops Workshop landed in Normandy in early August 1994 and after a short stay in a town near the beaches it moved to Giberville, a small village 8 kilometres east of Caen. The workshop was the first Canadian unit in the town. The townspeople and their "liberators" soon became friends. When the workshop moved on at the end of August a grateful mayor presented Major T.G. Quance, the workshop's commanding officer, with a special plaque. It was placed at the main crossroads in the village and no longer exists.[55] A duplicate is in the EME museum at CFB Borden.

The EME Branch Honour Roll

A regiment's honour roll records the highest contributions to a regiment's traditions. From it a soldier learns pride in belonging to his/her regiment and wearing its badge. 353 Canadian Craftsmen have given their lives in the service of their country. They lie buried in the four corners of the world. 240 are buried in Continental Europe in the Commonwealth War Graves cemeteries of England, France, Italy, Belgium and the Netherlands. 99 are buried in Canada and three in the United States. Others are buried in Hong Kong, Libya, El Alamein, Israel, and the Sinai.

All of them are commemorated on the EME Branch Honour Roll, which includes the 344 whose names are in the World War Two Book of Remembrance and are listed as serving in RCEME, REME, or are those of the RCOC who were technicians or were storemen serving in workshops; the four members of RCEME whose names are in the Honour Roll of the Korea Special Service force or who made the supreme sacrifice in Korea,[56] and the five members of RCEME, LORE, or LEME killed while serving on peacekeeping operations.[57]

Compiling an honour roll is difficult. The records of war are often hurriedly prepared in the heat of battle when the priority is on achieving victory. Consequently, there is every risk of error, such as inaccurate spellings of names and recording of corps and unit names. These risks were increased for RCEME because it was formed in the midst of preparations for the D-Day landings and the start of the Battle for Rome. To add to the confusion, a few of the RCEME tradesmen on infantry battalion strength fought in Normandy while wearing their battalion's badges and fighting as infantrymen. They were "re-badged" later during a respite in battle as they commenced working again to maintain their unit's equipment or, as occurred, in a few cases they were buried under the name of the unit to which they were attached.

The research for the EME Honour Roll, therefore, has been as comprehensive as possible. The main sources of information were the Book of Remembrance, the Commonwealth War Graves Commission's registers, and personal records held by National Archives of Canada. Nearly 400 personal files held by the Library and Archives Canada were examined to verify, for example, whether a soldier was a qualified tradesman or storeman in a workshop and had been in RCOC and/or RCEME.

Visiting the gravesites has been a series of pilgrimages by today's and yesterday's Craftsmen. It has deeply touched the more than 100 Craftsmen who participated. The comments of one serve as an example. Major A.G. Hall visited gravesites in Italy and as well, coordinated the photos taken by CFB Lahr staff of the gravesites in Continental Europe. He noted, "Everybody was deeply affected by the beauty of the cemeteries and the manner in which they were maintained. At the Montecchio Cemetery, a lady pruning plum trees in a nearby orchard gave us several branches laden with plums. She said that she had been a little girl during the

55. Côté, Capt, J.R., letter to the author, 1994.

56. Melady, John; *Korea: Canada's Forgotten War*; Macmillan of Canada, 1991, Appendix A.

57. Gaffen, Fred; *In the Eye of the Storm*; Deneau and Wayne, Toronto, 1987; Appendix D. Not listed is Corporal G. Larose who died while serving in UNDOF in 1993.

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war and that she remembered. Later during a remembrance ceremony at the same cemetery, an Italian farmer and his young son stopped work and stood with heads bowed for the entire ceremony. They too remembered."[58]

The EME Honour Roll is located at the School and comprises a scroll and four albums. In the albums, there is a page for each person honoured. The pages are arranged alphabetically by name and include some personal, regimental and gravesite data. Each page features a picture of the gravesite being visited by regular, reserve, or retired Craftsman.

The scroll alphabetically lists all up to 1993. Copies of the scroll have been deposited with 11 (Victoria) Service Battalion Museum, the Museum of the Regiments in Calgary, the Base Borden Museum, and the RCEME Gates. In addition, copies of the albums are at the RCEME Gates in Kingston and in the Museum at Borden. We have not forgotten.

DVA Commemorative Tours

Each year the Department of Veterans Affairs conducts a commemorative pilgrimage to the site of a selected campaign or battle. These pilgrimages have been run on a five-year cycle and have included D-Day/Northwest Europe, Italy/Sicily and Korea. For each tour the Colonel Commandant[59] of each regiment and corps that participated in the battle or campaign is asked to nominate a veteran of the battle or campaign and who has not already participated in a pilgrimage. The EME Branch, as the successor to the Corps of RCEME had regularly been asked to nominate veterans for these tours. Since 1991 the four Branch Associations have in turn been asked to recommend a veteran for nomination.

In 1992, on the 50th Anniversary of Dieppe, the Branch was represented for the first time by a veteran of the Engineering Branch of the RCOC on the pilgrimage to Dieppe. The Branch was also represented in 1994/95 on four extra pilgrimages which were conducted in order to mark the 50th anniversaries of D-Day and the close of World War Two, i.e. VE-Day and VJ- Day.

These pilgrimages have touched deeply the hearts of those who have participated. They have all commented that it had been an honour to represent RCEME and they have expressed satisfaction that the Government of Canada spent time and money on these events.[60,61]

Names of EME Buildings

One of the best ways to maintain regimental traditions is through the naming of buildings in honour of deceased veterans who have made exceptional contributions to the Branch. The name of a former member on a building provides a highly-visible, permanent record of an event that inspires young Craftsmen and encourages them to give their best under all circumstances.

CFB Kingston north of Highway 2 is called McNaughton Barracks, after General A.G.L. McNaughton, a long time Colonel Commandant of RCEME (see page 298). McNaughton Barracks is the site of the former RCEME School and contains the RCEME Memorial Gates, the EME Branch Memorial (see page 289).

Two of the barrack blocks are named after former RCEME officers. The Sherman Block is named after Colonel N.C. Sherman, who was the first Canadian graduate engineer recruited as, what would be called to-day, an EME officer. His service spanned both World Wars. The Lewis Block is named after Colonel A.R. Lewis, who had been 21C CREME of the 1st Commonwealth Division in Korea and later a CO of 202 Workshop Depot.

Three former training buildings are also named after former senior RCEME officers. Grant Hall, the former electronics building of the RCEME School, was named after Brigadier G.M. Grant, the DDME of 1st Canadian Army during World War Two. Dunlop Hall, the former apprentice training building of the RCEME School, was named after Colonel J.R. Dunlop, a former DEME. The Thompson Drill Hall is named after Colonel H.G. Thompson, the former commanding officer of 2 Army Field Workshop which was the first workshop that went overseas as part of the Canadian Army Special Force in World War Two. At war's end he was the DEME (see page 85). He was also the first President of the EME (then called

58. Hall, Major A.G.; *In Search Of EME Honour*; unpublished article, 1995.
59. or Honorary-Colonel or Colonel of the Regiment as appropriate.
60. Hansford, Capt G.; *Return to Italy*; EME Journal 2/85, page 27.
61. Letters from V. Cavanaugh, F.A. Ouimet, W. Ruggles, R.E. Crumb, W.H. Norton, R. Maynard and A.A. Stodalka.

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RCEME) Association (see page 259).

Milton House, the former home of the RCEME School Commandant, still stands. The former officers' mess of the RCEME School became the Base Warrant Officers' and Sergeants' Mess until torn down in 1995.

Workshop and Training Buildings. Since the late 1980s several workshops and EME training buildings have also been so named. In these cases the emphasis has been on giving representation to all ranks with a focus on acts of bravery shown in providing combat service in the front line under enemy fire.

Buildings so named include the Brodie, Carson, Pearson, and Rupert Buildings in CFB Borden (see respectively pages 259, 241, 40, 56 and 57), the Armstrong Building in MTSC Meaford (see page 42), the Grear Building in CFB Esquimault (see page 36), the Hurry Building in CFB Petawawa (see page 39) and the Sherman Building, which houses 12 (Vancouver) Service Battalion (see page 252). As this book is being written, a plan has been proposed to name the workshop building in CFB Shilo, the Davis Building (see page 7).

In each case there was an appropriate opening ceremony with a guard of currently serving Craftsmen. To the extent possible, relatives were identified and asked to participate. These ceremonies have helped to inspire our young Craftsmen because they can relate closely with the actions and the persons being so honoured.

Trades[62]

Trade Structure, Trades Training, Trades Badges,
Accreditation and Certification

The roots of the four EME trades lie primarily in the Canadian Army. The roots of the vehicle technicians also lie in the Royal Canadian Air Force (see also page 211) while the roots of some Aerospace Engineering and Communication & Electronic trades lie in RCEME.

Trade Structure

Up until the end of World War Two, the Canadian Army trade structure followed that of the British Army.[63] There were several trade fields, including armourer, armament, vehicle, instrument, electrical and, as the war progressed, radio (wireless) and radar.[64] A tradesman's skill was identified by the letters A, B and C, with Group A being the highest obtainable.[65] Group A tradesmen were known as artificers. In most trades Group B and C tradesmen were known as fitters. Exceptions included armourers and blacksmiths. At one time Radio technicians were also known as wireless fitters.

The number of trades was constantly expanded to cope with repair problems presented by an endless stream of new equipment. The corps a tradesman was in, i.e. what badge he wore, was often the result of how and where equipment was repaired. For example, fitters, armourers and blacksmiths could be found in the Combat Arms, RCE, and supporting corps such as RCOC, RCASC, and RCEME.

Trades were narrow in scope and tradesmen were given just sufficient training to repair the equipment for which they were responsible. The finer points of trouble-shooting and expedient repair were often picked up in an operational theatre. Fitters were replaced by vehicle mechanics tracked or wheeled. Radar and other electronic equipment led to the establishment of many new trades.

The end of World War Two brought demobilization and reductions in personnel and equipment. As a result the number of technical trades was reduced and the responsibilities for each trade broadened. In October 1946, trade standards were replaced by trade specifications demanding a higher degree of skill. Groups A, B and C were replaced by Groups 1, 2, 3 and 4, with Group 4 the highest. Most trades were given Group 1 training at the RCEME School. Group 2 training was conducted at the unit, usually a workshop. It consisted of an examination by trades test and practical repair functions. The Group 3 qualification was attained through formal training at the RCEME School or by trades testing, in accordance with individual trade specifications. Group 4 required pre-assessment followed by formal training, and those passing the

62. This section was written by CWO A.E. Rest, EME Branch CWO 1991-1995.
63. RCEME Technical Bulletins 6/1, 1/2, 11/4 and 12/1.
64. During much of the war the word RADAR was classified, so it was not used per se.
65. Thomas Lt W.A.; *Canadian Army Trades - Changes since 1945*; RCEME Quarterly 4/3, pages 16-18 and 31.

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course were called artificers or "tiffies" (see page 278) - later master technicians.

Trades were consolidated to provide a career path from Group 1 to Group 4. Those trades where progression was difficult were allied to primary trades, e.g. body repairmen, welders, tire mechanics and recovery mechanics were allied trades of the vehicle career field. Progression to Group 4 was by conversion course. Trades which did not lend themselves to this approach were gradually phased out, e.g. coach painter, sheetmetal worker, textile refitter, and tinsmith.

Changes in trades and trade specifications continued in the 1950s and 1960s. Trades such as pattern makers, recovery mechanics and tire mechanics were deleted and their essential functions passed to remaining trades. Aircraft trades were added so that RCEME could provide repair services for army helicopters and fixed-wing aircraft. Gun mechanics and armourers were given conversion training and remustered to weapons technicians. The vehicle technician Group 1 tracked and wheeled course was replaced by separate courses for each discipline. Conversion training was given at the Group 4 level.

Integration resulted in massive changes to trade structures and generated a new performance-oriented trades training approach. Trade specifications were replaced by occupation specifications in which rank and trade were tied together. In addition, trade groups were replaced by pay levels and Corps were replaced by personnel Branches, e.g. RCEME was replaced by LORE. The number of trades in the integrated forces was reduced through consolidation and elimination. Some technical trades and the non-technical trades migrated to other branches. Radar, radio repair, and welder, body, airplane and helicopter are examples of technical trades that were reassigned to new branches. Non-technical trades such as Drivers, Clerks and Storemen were also reorganized. Others such as the assistant instructor trade were deleted and personnel in them were remustered to new trades. Consolidation affected former RCEME trades assigned to the new LORE branch. Wheeled and tracked vehicle mechanics became vehicle technicians. Instrument and electrical technicians became electro-mechanical technicians. Specialist courses were developed to train technicians to repair equipment that was not in wide use throughout the Canadian forces. Examples are Leopard, M109, engineer equipment and security container courses.

At that time trade levels were changed from the Group to the Trade Level (TL) system. A Group 1 tradesperson became a TL3 tradesperson. TL1 and TL2 became new designators for the Recruit and Trained Recruit levels. By the 1980s this system was replaced by the Qualification Level (QL) system. QL1 and QL2 are the two Recruit levels, while QL3 to QL7 are the trade levels.

Adjustments and revisions to occupation specifications have continued to evolve to meet forces requirements. Many courses were expanded to rectify training deficiencies identified by combat units. In the mid-1980s the materials technician trade was created to fill a prominent gap in branch repair expertise. Its establishment allowed many former RCEME tradesmen, notably welders, to return to the EME fold.

In 1995 a complete occupational analysis for all EME trades was begun to ensure that the trade structure of the EME Branch is up to date for the future.

Trades Training

The method of delivering training is a mix of formal trades courses and on-job training. There are similarities with the pre-integration training system. The basic trades course is the QL3 and compares to Group 1. QL4 is on job training and compares to Group 2. The journeyman course is the QL5 and compares to Group 3. The QL6 courses compare to Group 4 but are given at the master-corporal/sergeant level. This is the highest trade skill course. The QL7 course is given at the warrant officer level and prepares candidates for master warrant officer and chief warrant officer ranks.

Trades Badges[66]

Distinctive trades badges have long been used to identify army tradesmen. Up until the end of World War Two there were two badges. Tradesmen in the armourer and armament field had crossed blacksmith's hammer and callipers which was the traditional British Army badge for these trades and had been in use in the Canadian Army for many years. The remaining technical trades were identified with a badge featuring the letter "T." The Group C badge was a T. The Group B badge was a T surmounted with a crown. Group A artificers wore the symbol with a crown and wreath. Trades badges were worn by all tradesmen and artificers

66. RCEME Quarterly 2/2 and Branch CWOs files.

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on the upper sleeve.[67]

When trades standards were replaced by trade specifications in 1946, Groups A, B and C were replaced by Groups 1, 2, 3 and 4. Unique symbols were used to identify trades employed in their assigned repair fields. Allied trades adopted the symbols used by the primary trades in their respective repair fields. For example, welders, body repairmen, tire and recovery mechanics wore the vehicle mechanic badge, a vertical piston with connecting rod and diagonal spanner. For each trade the Group 1 badge was the trade symbol alone, Group 2 the symbol over a wreath, Group 3 the symbol under a crown, and Group 4 the symbol with a crown and a wreath. Trades badges were worn by staff-sergeants and below on the lower right sleeve.

On integration in 1968, the use of trade badges was discontinued. Their use was revived when distinctive environmental uniforms came into use in the early 1990s. The badges followed the previous system with QL3 similar to the Group 1 badge, QL2 like Group 2, QL5 like Group 3, and QL6A like Group 4.

Accreditation and Certification

In the wake of World War Two there was a growing shortage of technically trained people in Canada. Soon there was a concerted effort to open new technical schools. In addition the Canadian military was recognized as one of the major institutions providing such training. Recognition of Engineering Technicians and Engineering Technologists was begun in the mid-1950s.[68] At that time some studies were done in DEME to formally accredit certain RCEME trades as Engineering Technicians or Engineering Technologists.

By the 1990s there was a shift in emphasis. Accreditation and certification of EME trades would help EME tradesmen get established in civilian careers. Potential employers do not have the resources to fully assess qualifications and competence, relying instead on established standards of licensing and certification. Hence a program for getting the EME occupations accredited was begun.[69]

Appointments

The Branch Advisor, The Colonel Commandant, The Branch Chief Warrant Officer

The Branch Advisor

A Branch Advisor advises the staff of National Defence Headquarters on regimental and personnel matters relating to his/her Branch.[70] This function perpetuates some of the responsibilities of an Officer Administering the Corps (OA Corps)[71] as set up in the mid-1930s. (A list of officers who have performed this role is at Appendix 3). An OA Corps had some command responsibilities and as such had a staff.

Prior to the formation of RCEME, these functions had been the responsibility of the DOS. The COME (and later the DMM), however, had represented the engineering side of RCOC to the DOS on matters relating to the OA Corps (see page 78). In 1944, on the formation of RCEME, the DME was also appointed Officer Administering the Corps (OA Corps) of RCEME. As such, he was assigned responsibility for certain functions with respect to personnel and regimental matters. From 1944 through to 1964 the functions of OA Corps remained with DME, later renamed DEME.

In 1964, as part of the Chief of Personnel's amalgamation of certain trades in the three services, the OA Corps' functions were split. DEME retained the personnel functions and was appointed the CFHQ Corps Representative, while the Commandant of the RCEME School was assigned the regimental functions and was appointed Head of Corps of the Corps of RCEME.

In 1966 the office of DEME became vacant and remained so. In fact it was disbanded (although

67. Norton, Maj W.H., Roddick, Capt V. (both former Armourer Artificers) and Putt, Capt C. (a former Armament Artificer); conversations with the author, 17 July 1995.
68. Hayes, WO1 J.W.; *Demand for Engineering Technicians and Technologists Increases*; RCEME Technical Bulletin vol 6 # 1, February 1961.
69. *Accreditation and Certification*; EME Journal 3/94.
70. Canadian Forces Administrative Order 4-11.
71. *RCEME Conference 1944*; conference minutes.

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never formally so stated) as gradually its functions were assigned elsewhere. Similarly, although RCEME was never formally disbanded, the formation of LORE progressed gradually starting with the selection of the Branch name in 1968.

This was a period of great organizational change, which included the formation and dissolution of Materiel Command. Consequently, the responsibility for these functions changed frequently and it is hard to trace the succession from then until the start of the Branch Advisor system. However, the appointment of Head of Corps of the Corps of RCEME was never rescinded, and officers holding appointments similar to the former DEME performed some aspects of the personnel functions. In addition, the Director-General Ordnance Systems (DGOS) was consulted on what are now the Branch Advisor functions, and by 1970 was being referred to as such (see Appendix 3).

In 1973 on the amalgamation of maintenance and design engineering DGOS was disbanded, the Director-General Land Engineering and Maintenance (DGLEM) Division was formed and the DGLEM was appointed LORE Branch Advisor (see Appendix 3).

As 1995 began, the Assistant Deputy Minister (Materiel) branch of National Defence Headquarters was reorganized and drastically reduced.[72] In July, the functions of the DGLEM Division were melded with procurement and other functions to form an Equipment Program Management (EPM) Division. The DGLEM Division and the position of DGLEM were terminated and the staff melded into the new division, called the Director-General Land Equipment Program Management (DGLEPM) division. The first DGLEPM was a former EME Officer, Brigadier-General J.J.R. Marleau, He was appointed EME Branch Advisor in June 1995.

However, the DGLEPM has procurement, engineering, and maintenance responsibilities. Hence the incumbent could come from a background other than EME. In addition, another NDHQ study indicated that the rank level of Branch Advisor should not be above the Colonel level. As this book goes to press these two factors make it uncertain as to what position will continue to have responsibility for the functions of Branch Advisor.

The Colonel Commandant

A Colonel Commandant fosters esprit de corps throughout his/her Branch; advises National Defence Headquarters on matters of significance, branch funds and property, cadet corps, associations, memorials etc; and liaises with affiliated corps and regiments and between regular and reserve units.[73] A Colonel Commandant is appointed by the Minister of National Defence on the advice of the Chief of the Defence Staff. The appointment is normally for three years with a one year extension and goes to a retired officer, usually of Colonel rank or above. Although travel expenses are reimbursed, there is no pay for the job. The reason for this is very important because it puts the Colonel Commandant outside of the chain of command. Therefore, he has direct access to all ranks in the Branch and, as well, to the Minister. This allows him to carry out his main function of fostering esprit de corps.

The position of Colonel Commandant has its origins in the regimental system of the British Army in the late 17th century. At that time, armies were loose organizations of privately-raised militia companies each under the command of a captain. However, the rising scale of battle during the continental wars of the time required better coordination within armies.

To meet this requirement many of these militia companies were expanded and reorganized to become regiments, each comprising several companies. A position of colonel was established to command the regiment in battle, and also to be the officer commanding the lead company of the regiment. Later, in order to provide a hierarchy of command, the officer commanding the second company was designated lieutenant-colonel. Thus the regimental system was established.

In the 18th century, the rise of empires demanded soldiers to garrison foreign stations. Consequently, regiments were reorganized into battalions, each comprising several companies under the command of a lieutenant-colonel. One battalion remained at home to recruit and train soldiers while the other battalions were stationed abroad. Replacement of soldiers was done by rotating battalions. While the colonel of the regiment was no longer required as a field commander, he had the responsibility for recruiting,

72. *Operation Accelerate* - Reorganization of the ADM(Mat) Branch of NDHQ 1994-95; DND report, 1994.
73. Canadian Forces Administrative Order 3-4.

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training, administration and the general well-being of the regiment.

Gradually staffs were built up to perform all these functions. However, a figurehead was still required and this function slowly devolved on the colonel. Eventually the title for the position became Colonel of the Regiment. A Colonel of the Regiment was a senior, highly respected former officer of the regiment nominated by the officers of the regiment to be the "embodiment of the spirit of the regiment."

It was his duty to foster the heritage of the regiment and to carry on its traditions and customs. In short, he was to help establish and maintain the culture of the organization. This was important because the work of the army was both dangerous and required team work. The regimental system recognized this and the fact that the individual soldier was the most important resource of the army.

In the regimental system in the UK, each infantry and cavalry regiment has its Colonel of the Regiment. Canada has adopted this idea and extended it. Each branch of the Canadian Forces - Armoured, Infantry, Logistics, Administration, Communications, Military Engineers etc - has a Colonel Commandant.

For regiments there are a number of similar titles. There is the position of Colonel-in-Chief, which is reserved for members of the immediate royal family. A Colonel of the Regiment is appointed for each infantry and armoured regiment having regular force units. An Honorary Colonel is appointed for each militia artillery, infantry, armoured and engineer regiment and for each militia service battalion. In addition, for those militia units having a lieutenant-colonel as commanding officer, an Honorary Lieutenant-Colonel may be also be appointed. RCEME/LORE/LEME/EME has had six Colonels Commandant (see Appendix 3).

General A.G.L. McNaughton, as GOC of 1st Canadian Army during World War Two, was associated with the formation of RCEME. He was born in Moosomin, Saskatchewan, on 25 February 1887. Graduating from McGill University in Electrical Engineering and Mathematics in 1910, he continued as an instructor there until World War One. In 1909 he joined the militia as an artillery officer and went overseas in September 1914 as a battery commander. He quickly won fame for his precisely-calculated fire plans, which greatly improved the efficiency and effectiveness of artillery fire and did much to save men's lives. He was promoted brigadier to command the Canadian Corps Artillery at the end of the war.[74]

Between the two world wars he served as Chief of the General Staff and as the first President of the National Research Council. After the war his appointments included President of the Atomic Energy Control Board, Canadian Permanent Delegate to the United Nations, and Chairman of the Canadian Section of the International Joint Commission. He retired in 1962 and passed away on 11 July, 1966.

Colonel A.L. Maclean, during his 31 years of regular service, was well known for his efforts to foster esprit de corps and for his efforts in training many craftsmen, artificers and officers. Born in Toronto on 29 January 1918, he graduated in metallurgical engineering from the University of Toronto in 1941 and was commissioned as a lieutenant that year. He went overseas as a member of 1 Canadian Base Ordnance Workshop in March 1942, and formed 1 Canadian Mobile Tire Repair Unit in Belgium in November 1944, commanding it until the end of the war. In 1948, he established and was the first head of the mechanical engineering department in the newly-reopened Royal Military College. He was on the directing staff of the Canadian Army Staff College from 1957 to 1961. He became the Commandant of the RCEME School and Head of Corps of RCEME in September 1965. He retired as Base Commander of Kingston in January 1973 and served one year as Vice-President of the LORE Association before being appointed Colonel Commandant of the Branch.

Brigadier-General A. Mendelsohn served as a regular officer for 32 years. He was born in Montréal on 21 March 1917. He graduated in mechanical engineering from McGill University in 1939, at which time he held a commission in the reserves. Transferring to the Active Service Force, he went overseas in 1941 with 3rd Canadian Infantry Division. As EME of that division's artillery headquarters, he landed in Normandy during the morning of D-Day. He remained with his division until the end of the war.

After the war he served on the directing staff of the Canadian Army Staff College, as the Canadian Military Observer with the United Nations Military Observer Group (India and Pakistan), as the first Commander of the Canadian Headquarters United Nations Forces in the Congo, Commandant of the RCEME School and, in 1962, DEME and Head of Corps of RCEME.

Promoted Brigadier-General in 1967, he was appointed to Headquarters, Materiel Command. Later,

74. RCEME Technical Bulletin 15/1, page 29.

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having served as Senior Military Advisor to the Canadian Delegation of the International Commission for Supervision and Control in Laos, he became Director General Maintenance and subsequently Director General Ordnance Systems until his retirement in 1972.

He passed away on 10 November 1995. At his funeral the Branch provided a Guard of Honour of 100 Craftsmen from CFSEME and 2 Service Battalion Maintenance Company. Lieutenant-Colonel D.W. Clarke was Guard Commander, Major R.A. Elvish was Guard DCO and Chief Warrant Officer T.P. Chaudar was the Guard RSM. The guard was probably the largest ever assembled by the Branch. It paid due honour to a former comrade who, during the turbulent times of Unification of the Canadian Armed Forces in 1968, had dedicated his foresight, energy and leadership to help ensure that the Branch remained a separately-identifiable engineering group in the Canadian Armed Forces.

Colonel G.W. Bruce served as a regular officer for 30 years and is a graduate of the University of New Brunswick. During World War Two he served in the armoured corps in Italy and in Northwest Europe. In 1946 he transferred to RCEME. His appointments since the war include Chief Instructor of the RCEME School, Deputy Director DEME and CO 202 Workshop Depot.[75] Retiring in 1971, he remained active for a number of years as a glider pilot instructor.

Colonel W.G. Svab is a graduate of the University of Saskatchewan, the Royal Military College of Science, and the Canadian Forces Staff College. He was commissioned in RCEME in 1949 and served as a regular officer for 33 years. He served in Korea as the maintenance officer with the armoured squadron and with 191 Infantry Workshop (RCEME). He commanded 3 Service Battalion and in 1973 was appointed Deputy Base Commander, CFB Gagetown. He has been the Canadian Forces attaché to Pakistan and Afghanistan and to Norway, Sweden and Denmark. Retiring in 1982 he took a civilian engineering position in DGLEM and retired in 1985. He was appointed Colonel Commandant of the LEME Branch in July 1987.

Colonel M.C. Johnston is a graduate of the Royal Military College of Canada and the University of British Columbia, he served 32 years as a regular force officer in command, staff and engineering positions in several places across Canada as well as Germany, the United States and Vietnam, retiring in 1983. From then to 1991 he was the Director of the National Emergency Agency for Energy in the Department of Energy, Mines and Resources and the Canadian Representative to the NATO Petroleum Planning Committee. He was appointed Colonel Commandant of the EME Branch on July 1, 1991. Active in supporting the Canadian War Museum, for several years he was president of the Friends of the Canadian War Museum. An active member of the Royal Military College Club, he became President in 1996. Well-known for his interest in the Branch, he is the author of the first Branch history, *Canada's Craftsmen*, which was published in 1984. As Colonel Commandant he travelled extensively, spending about 90 days per year visiting units and talking informally to all Craftsmen wherever they were: Yugoslavia, Cyprus, Germany, Comox, Gander, Yellowknife, the School etc, etc. These visits, often done with the Branch Chief Warrant Officer, helped greatly in developing and maintaining EME esprit de corps.

The Branch Chief Warrant Officer

The Branch Chief Warrant Officer is appointed by the Branch Adviser to provide him/her with advice on personnel and regimental matters as they affect the non-commissioned members of the Branch. The Branch CWO has usually been a member of DGLEM (now DGLEPM). The duty is a secondary duty. The Branch Chief normally holds an annual conference of all the CWOs in the Branch in order to identify problems and situations that need addressing. He also contacts them directly and visits them or accompanies the Branch Advisor and/or the Colonel Commandant on visits to bases.

The position of Branch Chief Warrant Officer has gained prominence since 1990 as part of the growth in Branch esprit de corps during the planning for the EME 50th Anniversary. The event that sparked this growth occurred in the fall of 1990 when Chief Warrant Officer R.E. Roy, then the Branch Chief Warrant Officer, was able to obtain all key approvals for the EME Badge in one day.[76] This was usually a process of several days (see page 274).

His successor, Chief Warrant Officer E.A. Rest, travelled widely, often with the Colonel Commandant and/or the Branch Advisor. Several times he represented the Branch, e.g. presenting the Benoit

75. DLES message #3321 dated April 1983.
76. Roy, CWO R.E.; *The approval of the Badge in 1 day!*; six letters signed 13 September 1990.

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Trophy in CFE in 1993 and accompanying the Logistics Colonel Branch Commandant in visiting the Logistics/EME soldiers in the former Yugoslavia in May 1995. More importantly, by strongly advocating the concerns of the NCMs - but always in the context of the welfare of the Branch as a whole - he has strengthened the position in the Branch Senate.

Sports

Curling was an important social function of early Canada in the winter months. In fact, when Montcalm and Wolfe met on the Plains of Abraham in 1758 little did they know that curling as a Canadian sport was one of the outcomes of their battle. Many of Wolfe's soldiers were Scots who settled in Canada and brought with them an ancient Scottish game resembling curling. As a result, Military Garrisons became the focal points of many curling matches, a tradition carried on today.

The start of a curling match or bonspiel usually follows Scottish traditions, and the participants are usually bag piped in for the opening ceremonies. At some EME bonspiels, colour parties dressed in period RCEME uniforms are also a distinctive part of the ceremony. Another part is the "shot rock" which was made by vehicle company of the School and called the "Director General's Stone." It consists of a modified large cylinder head donated by the Harper Diesel Training Cell. After being thrown it is usually assisted by "honoured sweepers", who have perfected the process of getting the stone to the button!

While fun is the name of the game, there are serious competitors bringing "A" Division into a very high calibre of play. However, it is the dedicated support from Branch, base, and community that has always made these bonspiels a success.

There have been four EME Bonspiels; Western, Central , Eastern, and CFE. The first of what became known as the **EME Central Bonspiel** took place in January 1964 when 14 Company RCEME hosted the first RCEME Command Spiel in Camp Borden. In 1994 there were 100 rinks participating, the largest ever. {In 1995 the absence of many key organizers on duty in Croatia could have slowed the planning... but it didn't. The bonspiel went ahead with 72 rinks. Some even got back from Croatia in time to compete!}

In the spring of 1965 the hockey season was suspended for a couple of weeks while the ice was cleared, under the tutelage of Warrant Officer (Class 2) T.W. Hooper, and set up for curling. He and Staff-Sergeant R. Currie worked all night preparing the ice for the first match.[77] The resulting RCEME bonspiel was the precursor to the **CFE EME Bonspiel** which was started in 1967. The 26th and final Bonspiel was held in 1993 amid the closedown of CFE. Over the years the CFE Bonspiel was a major event on the EME calendar with curlers from all over Europe and many UN postings, particularly Cyprus and the Middle East as well as some from Canada. It was times like this that the camaraderie of Craftsmen was enjoyed and its value noted. {The last bonspiel in Europe was a funspiel in the spring of 1994 when there were only 50-or-so EME personnel in Europe. "So the very last stone for the EME Bonspiel European event was finally thrown during an event attended by only a few good men who had a whale of a good time in memory of all those who had gone before.}[78]

The **EME Western Bonspiel** was traditionally held at Penhold, Alberta. But with the downsizing of the Canadian Forces, the 24th was the last one held there. In 1995, the spiel was held at Cold Lake, its new home. Thirty-eight rinks participated from Trenton and the School through to Comox. In a time of increasing difficulties with transportation and priorities on preparation for UN duty in the former Yugoslavia, this is mute testimony to the value of strong *esprit de corps* that these bonspiels promote.

The 15th **EME Eastern Bonspiel** took place in March 1995. There were a large number of young Craftsmen participating that year, as traditions continued. The spirit of this spiel is family, as most curlers come from the Maritimes and the "cheering" team was most noticeable, as usual!

Hockey is another popular EME sport. Many EME units have hockey teams in local base leagues. The game depends on teamwork and develops dash and confidence. CFSEME initiated the first Branch

77. Hall, Maj A.G.: letter to the author, July 1995.

78. Spencer, WO J.G.; *The RCEME/LORE/LEME/EME Curling Bonspiel - European Edition*; article, 1995.

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Hockey Tournament in 1993. The tournament there the next year was the last scheduled 50th Anniversary Event.[79] 14 teams from central and eastern Canada participated in three classes, and the winners were Valcartier, Meaford and Chatham. The tournament showed how popular the game is with the young (and not so young) soldiers and the initiative that they show in getting to tournaments like this.

Other sports. Baseball and track and field, like hockey, are popular sports at the base level in leagues and in EME Birthday tournaments. EME golf tournaments are also popularon a regional basis. Sporting events were a major feature of many local EME 50th Anniversary celebrations.[80]

Skill Demonstration Teams

Over the years there have been many examples of skill demonstrations. Often these are displays at workshop open houses. A good crowd pleaser, however, is the quick assembly and disassembly of major pieces of equipment. Young Craftsmen, always eager to put on a good show, have eagerly participated in them. The most recent were the Jeep team during 1994, along with the Leopard powerpack change and the L5 pack howitzer skill team during the 50th Anniversary National Weekend (see page 312).

In 1952 a team from the RCEME School demonstrated their skills at the Canadian National Exhibition. They had a quick assembly and disassembly jeep and a 75mm pack howitzer. As Captain W.H. Norton, the team leader, noted, "For three weeks we did hourly shows involving a gun-run team under the command of Staff-Sergeant N.A. Graham and the jeep team. We had numerous people from our audiences tell us that it was the best free show in the exhibition. We ran speed competitions against the gun and the jeep. Lots of good times."[81]

In 1967 there was a much larger effort as part of the Centennial Tattoo which travelled across the country. "There were four vehicles," recalled Lieutenant R.P. Britt, the 50-man team's leader.[82] "We had four jeeps and one spare. Our act was part of a humorous skit. We were dressed as hobos and as we put together or stripped down the jeeps there were some keystone cops to chase us. The team was trained under the tutelage of Staff-Sergeant P. Funk in the radar hall in the electronics company of the RCEME School." "The jeeps, which were M-38s, were modified at vehicle company of the School," recalled Master-Warrant-Officer Y. Laverdière.

There have been other skill demonstration jeeps made on a local basis. An example is the one made by the maintenance platoon in the summer of 1988 for the Airborne Regiment's 20th Anniversary celebration in CFB Petawawa. "The whole thing was the idea of our ET, Master Warrant Officer J. Vass, and was done within our platoon's resources," noted Master-Corporal M.W. Holland, who led the project. "We used simple quick release joints, a few cotter pins, gravity fuel feed and sealed water jacket etc. The scenario was humorous; a UN driver leaves his vehicle unattended, it is whisked away by bandits (the skill team), a call for help and it's EME to the rescue. We had the jeep apart in 56 seconds and together and running in a minute 20 or 30. We did the show to a crowd of over 4,000. It was such a success that for the next six months we performed for every parade in camp. The jeep was even sent to the Nova Scotia Tattoo for 1989. After that we had it reverted back to a regular jeep, because it was taking too much of our time."

"The maintainers were involved in many projects for the Airborne 20th. For example, our welder, Corporal L. Desahambault, made a special archway for the entrance for the tattoo. It is now in the Z-Lines as an entrance to the airborne compound. The airborne maintainers had put on a good show."[83]

79. *50th Anniversary Hockey Tournament*; EME Journal 1/95, page 20.
80. Escobar, Capt J.A.; *Atlantic Region EME 50th Anniversary Golf Tournament*; EME Journal 1/95; page 23.
81. Norton, Maj W.H.; several letters to the author; 1994-95.
82. Britt, Maj R.P.; report, 1973.
83. Holland, MCpl M.V.; taped interview with the author, 1984.

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Institutions

The EME Senate, The Annual Conference, The Associations, Technical Bulletins, EME Museum, Base/Unit Museums, Officers' Fund, Kit Shop.

The many Branch institutions include; the Senate, the Annual Conference, the Associations, the Technical Bulletin, the Museum, the Officers' Fund and the Kit Shop. Through these institutions EME customs are originated and maintained, memorabilia distributed and retained, and traditions developed and preserved.

The EME Senate comprises the Branch Advisor, the Colonel Commandant, the Branch Chief Warrant Officer, general officers who were formerly members of the Branch, and the colonels of the Branch. They meet a couple of times a year to review and discuss Branch matters and to advise the Branch Advisor on Branch policies. The range of subjects discussed include trades structures, manning levels, new technologies, and equipment and dress regulations.

The Annual Conference usually takes place in May. The theme varies slightly every year but its purpose is still to exchange ideas and opinions on current problems and to advise the Branch Advisor and DGLEPM of problems in the field. There are variations in conference delegates from year to year but, generally speaking, all Branch senior officers of the rank of lieutenant-colonel and above attend, as well as selected officers and chief warrant officers from line and staff appointments. In 1977 the conference theme was trades structure so that, as an innovation, many senior warrant officers attended. This conference was an outstanding success and the innovation has since become practice.

The first Annual RCEME Conference[84] was held in Ottawa on 22-24 June 1944, barely a week after the formation of RCEME! Chaired by the DME, Colonel R.L. Franklin, the conference was opened by the Deputy Master General of the Ordnance. The purpose of the conference, unchanged even today, was to enable headquarters staff officers to meet with line officers from the field to discuss problems and to acquaint all with the latest plans and policies. Consequently the themes varies each year, e.g. for the 1994 Bluebell Conference it was Operation Excelarate, the NDHQ program for downsizing the Materiel Group in the headquarters and changing the way it does business.

The Associations. The EME Branch does not have a formally constituted Branch Association. However, there are five associations which are closely linked with the Branch. Four are essentially regional associations with the prime objectives of camaraderie, mutual assistance, maintaining traditions and generally promoting the Branch. Their names (with areas of largest strength) are: The RCEME Association (central and eastern Canada), the RCEME Prairie Vets (Manitoba), The RCEME Association of Alberta (western Canada) and the RCEME Club (the west coast). The remaining association, a constituent association of the Conference of Defence Associations, has the additional objective of proffering advice to the Government of Canada. It is the EME Association (see page 258).

Technical Bulletins. The present *EME Journal - La Revue GEM*, is the fourth of the journals that have been published over the years for the Corps/Branch. Started in 1976, it was originally called *Land Technical Bulletin technique GM TER*. In late 1977 its name was change to *LORE Technical Bulletin technique du GM du TER*. The name was changed again in 1984 to the current name in order to match the name change that year of the Branch.

The first technical bulletin was *CAM*, which was published monthly by the Directorate of Mechanical Maintenance from October 1943 to September 1945. This magazine was published in support of the Canadian Army Preventive Maintenance program,[85] and was primarily a technical information publication. However, it was distributed throughout the Corps and became, in fact, RCEME's magazine (see page 81).

The second was the *RCEME Quarterly*, published four times a year from January 1949 to January 1953. It was stopped because of a change in policy regarding publications. The third was the *RCEME Technical Bulletin*, which was published 53 times over a sixteen year period from May 1956 to December 1971. During 1968 the title became Technical Bulletin. It was stopped because of the gradual dissolution of the staff at the School and at NDHQ caused by moves and changes resulting from unification of the Canadian

84. *RCEME Conference 1944*; conference minutes.
85. *CAM*; published by DMM and DME, 1944-45, issue 1/1, page 1.

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Forces. The value of these journals was, and remains, immense. The news of unit activities, notes on personalities, technical papers, discussions of problems, information on plans, policies, new orders and regulations were invaluable in maintaining Corps cohesiveness and spirit, in keeping Corps members up-to-date technically and militarily and in assisting in building a good image of the Corps. Each time the journal was stopped, its value was soon recognized and publication started again.

EME Museum. The RCEME Museum was officially opened on 21 October 1967 by Colonel R.A. Campbell, a former DEME. Work on the museum had started two years earlier under the direction of Colonel K.R. Ward, who appointed Major R.F. Fendick as the first chairman and Sergeant E.N.V. Thibault as the first curator. The museum was located in one of the World War Two barrack huts near the entrance to the gates of the McNaughton Barracks in Barriefield. When the RCEME School was closed in 1970 the museum was moved to Borden.

Today, the EME Museum forms part of the CFB Borden Museum. It is housed in part of a former drill hall along with the former RCASC Museum. A museum committee (on which the EME Branch is represented) operates the museums which are open to the public.

The EME Museum has an extensive collection of Corps/Branch memorabilia, uniforms, trophies and documents, although only a small portion is on display at any one time. A popular feature of the museum is the vehicle collection. Included in it are many World War Two RCEME vehicles including a Diamond-T wrecker, a 15cwt KL Lorry (truck mounted electric and gas welder) and a 60cwt machine shop truck. Located at Vehicle Company of the School are a Sherman ARV of Korean War vintage and a Centurion ARV. Many of these vehicles are runners and all have been lovingly restored by Craftsmen while at the School as students or instructors. Some have been acquired as surplus when taken out of service, while others, like the Diamond-T wrecker, are gifts from interested civilians.[86]

Base/Unit Museums. Several Base Maintenance Staffs and Maintenance Units have started and/or participate in museums which show the EME History and tradition. Collections of Corps/Branch badges, trophies, uniforms are evident in many workshops and base museums across the country. On some bases, such as CFB Wainwright, collections of old vehicles are cared for by EME Craftsmen. Sometimes the vehicles are EME vehicles such as the ARV at CFB Gagetown[87] or the 5-ton wreckers at CFB Chilliwack and CFB Petawawa[88].

Officers' Fund. The RCEME Corps Officers' Fund was established in 1955 by the DEME, Colonel J.R. Dunlop, to provide a general fund for the financing of any project which would benefit the Corps as a whole.[89] Over the years the fund regularly contributed prizes for the best candidates on the junior officer courses. By 1968 the assets of the fund were valued at sixteen thousand dollars, including mess silver, crystal, pictures, prints and sword and gun collections. The LORE Officers' Fund was subsequently established to succeed the RCEME Officers' Fund, to hold and manage these assets and to perpetuate the aims of the original fund. The affairs of the fund are managed by an Executive Committee comprising the colonels of the Branch, the Branch Advisor and other general officers who are former LORE Officers. One of the current successful projects of the fund is the Kit Shop.

The fund is currently named the EME Branch Officers' Fund. Since the Branch has no Branch Fund, i.e. an all ranks regimental fund, a special sub-account of the Officers' Fund was set up as the repository for the 50th Anniversary Trust and General Funds.

Kit Shop. During the early 70s, there was a need to create a LORE image. Consequently, a LORE Kit Shop was set up (originally as an adjunct of the LORE Officers' Fund) to develop and sell LORE artifacts; cuff links, tie tacks, jewellery, mugs, crests, sweaters, etc. The Kit Shop is now virtually autonomous. It is operated by the senior EME officer at CFSEME who reports to the executive committee of the EME Officers' Fund only for guidance and policy.

For years the Kit Shop was operated by a succession of young officers at the School as a secondary duty. In 1993, as preparations for the EME 50th Anniversary progressed, it became evident that the Kit Shop had to be put on a more business-like footing. Full-time help and more funding was needed if the Kit Shop was to meet the expected demand across the country. Consequently, Lieutenant-Colonel D.W. Clarke, the

86. Shwaluk WO D.; *LCol(Retd) B. Savage donates a Diamond-T to the Museum*; EME Journal, Fall 88.
87. *Dedication of a Centurion ARV at Gagetown*; EME Journal 1/91, page 10.
88. Forder, MCpl L.; *EME 50th at Petawawa*; EME Journal 4/94.
89. DLES message 3321, 1983.

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School Commandant, made a business plan, secured a loan from the 50th Anniversary Fund (quickly paid back) and engaged Warrant Officer G. Johnston, an EME reservist from London, to run the Shop. Sales went from $35,000 in 1992 to $145,000 in 1994.

Today the Kit Shop is a thriving, bustling operation with outlets and a distribution network in most camps. This has been successful because of leadership shown at the School, the dedicated volunteer work at the local level and availability of products to meet demand.

Affiliations

From its inception, RCEME was affiliated and very closely associated with REME. After 1968, the affiliation was lost but the association continued. Finally, in 1977, after an exchange of letters, LORE became affiliated with REME, thus again officially cementing firm bonds of friendship.[90] These bonds were reaffirmed in the exchange of gifts between the two corps on the occasions of their 50th Anniversaries in 1992 and 1994 (see page 307).

The main benefit of this affiliation is a familiarization with each others' equipment, working methods and personnel. This familiarization is important because not only did REME and RCEME work closely together in World War Two but REME and EME have continued this close collaboration in, for example, the Gulf War and UNPROFOR (see pages 159 and 174). Exchange and liaison positions help maintain this familiarization (see page 245).

Families

The families of the Craftsmen are an important part of the EME tradition. In 1994 at the RCEME Association's Annual Reunion, the traditional Sunday morning service was conducted at the RCEME Gates by the Association's Padre, Don Chisholm, who had served as a vehicle technician in the Corps for many years. As part of the service his wife, Helen, spoke about the families.

"As we celebrate the Fiftieth Anniversary of the RCEME family, let me bring to you the perspective of the women, the wives and sweethearts who were always there in the background. My father joined up in September 1939 as soon as war was declared. He served first in the Ordnance Corps and then in 1944 in RCEME. That action profoundly changed the life of our family but, most of all, my mother's. Her time then was spent waiting for mail - which sometimes involved long intervals of time, baking and knitting to send in parcels, keeping busy with the Red Cross, reading the newspapers, listening to the evening radio broadcasts, raising our children - of course, running the home, trying to provide as normal a home atmosphere as possible, and all the while never knowing if her loved one was alive, wounded, captured, or dead. That was a long separation until he came home from overseas in October 1945. Times have changed and through the years the tours of duty have changed - to the Korean conflict, to the many-faceted UN Peacekeeping duties and to the Gulf War. Alongside of those have been the many schemes; Fallex's, Reforgers, and training programs, which also meant that the men were gone from home for weeks or months, again profoundly affecting the whole family.

"Let us recall our initial reactions and feelings when our spouse came home with the announcement of the new assignment. Sometimes it was fear - "there is a war on there!" Sometimes it was anger - "we just arrived here, we're not unpacked, we're in a strange country, I don't drive and we're twenty klicks from Lahr, the kids have to be registered in school - and you're leaving for seven weeks!" Sometimes it was - "here we go again - big boys playing war games," which meant helping him pack and get ready to leave and lines of washing when he got back. Our circumstances also affected our reactions. Sometimes, we had just arrived on base and didn't know a soul; sometimes we were the only one left on her own and felt like a fifth wheel; sometimes we were part of a contingent of spouses left on a base. No matter what, our part of the deal was

90. *DCI Army 150/77*; Defence Council Instruction; UK; 1977.

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always the same. We kept the home running smoothly; handled the finances; took the kids to Cubs, Guides, hockey games, dentist appointments, attended parent interview nights; worked through large and small crisis situations and finally when the house was quiet at night dealt with the loneliness."

"UN Peacekeeping assignments or on major training exercises and courses - we knew it was part of the deal. When we look around today at each other or look back on our own experiences we realize that we became more self-confident, more capable and more independent persons because of these separations. We knew that we were a team and that we could handle our part. I also firmly believe that our spouses were able to handle their duties and responsibilities, wherever they were, with a much freer frame of mind, confident in the knowledge that when RCEME was away, we spouses left behind had everything under control at home."[91]

91. Chisholm, Mrs. H.; *RCEME*; unpublished notes, 1995.

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Chapter 21 - THE 50TH!

1992 - REME and RAEME, 1994 - EME

The EME[1] 50th Anniversary celebration was the culmination of surging EME Branch spirit and several years of planning and preparation. Along the way, two of the Branch's sister corps, REME and RAEME, celebrated their 50th Anniversaries in 1992. It was an excellent opportunity to get ideas and to instil interest in our own celebrations.

1992 - The 50th Anniversary Celebrations of REME and RAEME

Corps Days. Both the Corps of Royal Electrical and Mechanical Engineers (REME) and the Corps of Royal Australian Electrical and Mechanical Engineers (RAEME) held Corps Days as part of their 50th Anniversary celebrations in 1992. The EME Branch was represented at both.

Brigadier-General R.N. Fischer and his wife represented the Branch at the REME Corps Day at the Corps' Home Station in Arbourfield, England, on July 4th. Events included a display of 21 historical vehicles, the unveiling of the REME Memorial Statue, and the naming of the Chieftain ARV: the Reclaimer.

Colonel J.A.N. Nault and his wife represented the EME Branch at RAEME's Corps Day at the RAEME Training Center in Bandiana on 27-29 November 1992. On the 27th, a colour parade started the 50th Anniversary weekend,[2] and that evening mess dinners were held. An open house and all-ranks dance on the Saturday and a church service on the Sunday rounded out the weekend.

Exercise Master Craftsman.[3,4] To commemorate 1992 as the 50th anniversary of its formation, REME arranged a number of activities. Of significance to the EME Branch was Exercise Master Craftsman, an adventure training expedition which took place between March and October and involved a passage from England across the Atlantic Ocean, across Canada to the Pacific Ocean and return. To mark the close affiliation between the two organizations, REME opened the expedition to EME personnel. While crossing Canada the expedition drew its logistic support from a number of Canadian Forces Bases and EME organizations. The EME Branch also hosted several receptions for the expedition's personnel.

The aim of Exercise Master Craftsman was to replicate the expedition undertaken two hundred years earlier by Sir Alexander MacKenzie to find the North-West Passage. It was split into phases, each sub-divided into legs with a team change at the end of each leg. Some 180 REME and 30 EME personnel took part. The phases which principally involved the Canadian Forces were identified with "MAPLE" in the title. {MAPLE SAIL was sailing by yacht from the UK to the Lakehead and later returning to the UK.} MAPLE CANOE was canoeing 2,000 kilometres from Fort McMurray, Alberta to Quesnel, British Columbia. MAPLE TRAIL was trekking 400 kilometres from Quesnel to the Pacific Coast at Bella Coola using the Alexander MacKenzie Heritage Trail. The teams carried, in relay, two REME talismen. One was presented to

1. The Branch name was changed from LEME to EME on 1 January 1994. Some of the events in this chapter took place before the name change. Others took place after. For ease of reading, however, one name, EME, will be used.
2. *Craftsmen of the Australian Army - the Story of RAEME*; official RAEME history, 1992, page 246. (RAEME has its own colours, called the Prince Phillip Banner, which was presented to the Corps by Prince Phillip in 20 May 1986.)
3. *REME 50th Anniversary Celebrations*; special issue of the EME Journal Spring 93.
4. *Exercise Master Craftsman 1992*; Corps of REME, 1993, page 5.

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the EME Branch in St-John's, Newfoundland, as the expedition departed Canada. The other, along with an EME Talisman, was returned to the UK.

Exercise Master Craftsman concluded on 1 October 1992, the 50th birthday of the formation of REME and the final day of its 50th Anniversary celebrations. The EME Branch was represented by Colonel M.C. Johnston (the Colonel Commandant), his wife, Chief Warrant Officer A.E. Rest (the Branch Chief Warrant Officer) and Corporal M. Waters. Corporal Waters delivered the EME Talisman, a replica of Champlain's Astrolabe (see page 286), via parachute drop to the Colonel Commandant. He and the Branch Chief Warrant Officer then presented it to the REME Corps. REME's pair of Talismen are now on display in the REME museum at Arborfield, England while EME's pair are at CFSEME in CFB Borden.

The success and safety of the expedition depended very much on the support provided by the many Canadian Forces and RCMP organizations en route which provided assistance spontaneously and acted as most cordial hosts in entertaining the teams as the expedition crossed Canada. It was a great warm-up for the EME 50th just a few short months away.

1994 - The EME 50th Anniversary Celebration

Plans and Preparation, Fund raising, "Kick-off" Events,
The National Weekend, National Projects, Local Celebrations

"I remember the day I stood outside the Rafah Mess in CFB Borden and was formally received into the LORE Branch. And, if truth be told, I had no idea of the significance of that moment. The years have passed since that day. I made it through the trials and tribulations of EME Training. Today, as May 15th draws close and I look into the faces of the soldier-technicians of the Workshop and feel the esprit of our "Corps" as we carry out our day-to-day routine, now I know what it was that I did when I pinned a LORE cap badge to my beret for the first time.

That day I joined the ranks of a Corps whose birth on 15 May 1944 was forged in the crucible of war and whose first days were bloodied on the beaches of Normandy and in the Liri valley. During the years following the end of World War Two, RCEME continued to provide integral combat service support to the Army in the Korean War as well as UN peacekeeping missions in several countries. At home, RCEME continued to refine its focus and to evolve the structure of technical workshops. On 1 February 1968, the Land Ordnance Engineering Branch, complete with newly fashioned "wankel" cap badge, was formed to replace and take over the role of RCEME. In a sense it was the end of an era, and in that passage from the old to the modern, the visible and proud identity with a battle-won reputations of the "three-shield" badge and "horse" cap badge and being "EME" went quietly by the wayside.

However, in the hearts of the officers and the craftsmen, we were still "RCEME," and not a few of the old guard kept the old RCEME cap badge firmly pinned to the inside of their berets. Indeed it was the determination of the men and women who never forgot the proud tradition and history of the Branch that led us to change our name and our cap badge yet again. On May 15th, 1984, we became the Land Electrical and Mechanical Engineering Branch and on 15 May 1991, we proudly rebadged from the LORE "wankel" cap badge to the EME "horse" cap badge which we wear today. As of 1 January 1994, in recognition of the fact that we serve alongside the Navy and the Air Force as well as the Army, we are now known simply as the Electrical and Mechanical Engineering Branch."[5]

This excerpt is from one of the many EME 50th Anniversary articles that appeared in base newspapers during 1994. It neatly sums up the pride that we have in being a separately identifiable engineering corps in the Canadian Armed Forces. We are "the RCEMEs," the Electrical and Mechanical Engineers of the Canadian Armed Forces. We have been for over 50 years and we celebrated all year long with an ambitious program of events ranging from a skill demonstration team to a skill-at-arms competition. It was indeed a show of "Arte et Marte" done up in typical EME work hard, play hard fashion.

The aim of the EME 50th Anniversary celebration was to celebrate the 50th Anniversary of the formation of RCEME and to commemorate 50 years of EME service to Canada's Armed Forces. Key to achieving that goal were a well-thought-out, well-prepared plan enthusiastically executed by all members of the Branch; successful fundraising; a well-staged kick-off; memorable national events; and regional events all year - everywhere.

5. Sardana, Captain N.; *RCEME-LORE-LEME-EME: Fifty Years of Service*; Lookout, CFB Esquimault, 1994.

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By any standard the project was a great success and was done in style! In fact when it was all over the EME Branch Advisor, Brigadier-General V. Pergat, neatly summed it all up: "We did it - What a Party!"[6] {The national budget for the celebration was half-a-million dollars. Even as the celebration started this goal had already been met. But to do all this required the teamwork and hard work of many.}

Plans and Preparation

As the 1980s closed it had become evident the there was more than enough esprit de corps for a 50th Anniversary celebration. But there were two problems. The first was how to fashion a 50th Anniversary when we had very many, very small units - all across the country and wherever Canadians served around the world. The other problem was to link 50 years from RCEME to EME. The answer was to celebrate the 50th Anniversary of the formation of RCEME and to commemorate 50 years of EME service to Canada's Armed Forces, to celebrate everywhere and to celebrate all year long.

This was a big project which involved the whole Branch. From a relatively small group of 4,000 spread thinly all across Canada and in most UN missions, national and regional events were staged - all year long. The first event - a province-wide officers, warrant officers and sergeants mess dinner - was held in CFB Gagetown on 13 January 1994. The last event was the EME 50th Anniversary hockey tournament held at CFB Borden from 7 to 10 December. In war-torn Visoko in Bosnia-Herçegovinia there were two celebrations. In April the "Olympics of Visoko" (see page 177) were staged by the maintenance troop of the 12e Règiment blindé just before their return home to Canada and, in May, the maintenance troop of the Lord Strathcona's Horse (Royal Canadians) held a Sports Day. The celebration was immensely successful. In the end, we all said "What a Party!"[7] {The idea of holding an EME 50th Anniversary celebration was discussed in many places and levels throughout the Branch during the mid-1980s.} At its May 1987 meeting the EME Senate put in place the organization needed to raise funds for the 50th and to co-ordinate events.

It was soon realized that the scope and scale of the celebration was immense, eventually involving 120 units. Consequently planning and preparation was set up on a classic project-management basis. The EME Senate began by forming itself into the EME 50th Anniversary Steering Committee. The Committee was chaired by the Branch Adviser (initially Brigadier-General R.N. Fischer and later Brigadier-General V. Pergat) and included representatives from the EME Association[8] and the RCEME Association.[9] The Steering Committee provided general direction for the planning of events and for fundraising. It held 16 meetings from 14 October 1987 to 13 October 1994. Reporting to it was the EME 50th Anniversary Coordinating Committee.

The coordinating committee comprised representatives from the various regions and commands and was chaired by the Director Land Engineering Services, Colonel J.A.N. Nault. The committee ensured the coordination of national and regional events and monitored the progress of fundraising efforts and planning for events. It held 11 meetings from 26 April 1988 to 14 May 1993.

Initially, committee work was done on a secondary duty basis. However, by 1992 the scale of work had increased to the point that planning was getting behind. A visit early that year by planners for Exercise Mastercraftsman (see page 306) resulted in some sound advice: get some full-time help. Accordingly, on 1 February 1993, Major J.G.L. Vachon was appointed Staff Officer 50th Anniversary (SO 50th) and tasked to assist the two committees. He immediately reviewed the minutes of all of the meetings of the two committees and produced a 50th Anniversary matrix which listed all decisions and the actions taken to carry them out. There were many contradictions and missed completion dates. Under his guidance and cajoling these were corrected and, from then on, planning proceeded smoothly and on time.

Many projects were immensely detailed. For example, an early decision was that, to the extent possible, an EME general or colonel would be available to act as the dignitary for every regional event. Only 13 dignitaries were available for 40 events! Success depended on planning a year in advance and a great deal of carefully detailed staffing.

6. Pergat, BGen V.; EME Journal 4/94, page 1.

7. EME Journal 4/94, cover.

8. Major(Retired) N.A. Graham, the EME Association representative was a successful businessman with much experience in fundraising. He faithfully attended nearly all Committee meetings at his own expense and contributed ideas generously.

9. Mr. G. Turcotte was the RCEME Association representative. He initially presented the Association's idea of The Freedom of the City of Kingston, a key event in the celebration and in linking the past with the present.

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Fund Raising

The second key to the success of the project was fundraising. And what a success it was! The national budget was about $530,000 and, by the beginning of 1994, that amount had already been raised! By the end of the year $630,000 had been raised through car draws, corporate donations, unit assessments and personal pledges.[10] In addition, at the local level, units raised funds in a variety of ways for their own local functions. $38,000 of the national budget was returned to units to help them with their functions.

The personal pledge program was one of the cornerstones of the fundraising program. In the end there were 1,038 contributors who donated a total of about $214,000. Of those, 738 were serving members of the Branch (at the time the Branch strength was about 4,000 regulars and 1,000 reservists). The remaining 300 donors were retired or made donations in honour of deceased former members of the Branch.

The car draws were one of the very visible means of raising funds. The idea for a car raffle was first suggested by Major(Retired) N.A. Graham (see pages 284 and 308). The five draws held - each with a car as the main prize - steadily increased in popularity and raised $181,400 in total. The first draw, conducted by the School, sold 21,600 tickets and netted $14,800. The last draw was run by LETE, sold 45,800 tickets and netted $47,300.[11] For the latter draw Major S.J. Gill donated $20,000. He was on the podium when the winning ticket was drawn at the end of the skill-at-arms competition during the national weekend.

On the other hand one of the least visible means of raising funds was the corporate sponsors program. In the end, 58 sponsors donated on the average $2,000 each.[12] It was this extra financial push that made the whole program a resounding success. Many of the corporate sponsors accepted an invitation to attend the national weekend.

The unit assessments program had the objective of raising $2 per person per year on strength for five years. The program realized $50,000, with 78 units achieving the objective. Their names are engraved on the cover of the time capsule at the commemorative monument.

"Kick-off" Events

{The first 50th Anniversary Celebration event was a mess dinner for all EME officers, warrant officers and sergeants in New Brunswick on January 13th. The Branch Advisor, Brigadier-General V. Pergat, was guest of honour. The next day he informally met and talked with all Craftsmen on the base. Regular, reserve and retired members of the Branch participated in both of these events, representing the enthusiastic participation of all members - everywhere - all year long that made "The 50th" such a success.}

The celebration was officially launched as part of the 57th annual general meeting of the Conference of Defence Associations in January 1994. This achieved maximum high level exposure for the celebration - at the start. A dinner on the evening of the 20th sponsored by the EME Association and organized by the Ottawa Chapter under the leadership of Lieutenant-Colonel(Retired) B.P. Brown, the Chapter Chairman, and assisted by Lieutenant-Colonel(Retired) J.W. Youngs and Captain(Retired) W.E. Skitterall.

With over 100 in attendance at the dinner, the guest of honour was Major-General(Retired) W.G. Paisley, Chairman of the Conference of Defence Associations. Other guests included: Lieutenant-General G.M. Reay, Commander Land Forces; Rear-Admiral M.T. Saker, Assistant Deputy Minister (Engineering and Maintenance); two past EME Branch advisors, Major-General R.N. Fischer and Major-General(Retired) E.B. Creber; Brigadier-General V. Pergat, EME Branch Advisor; Colonel M.C. Johnston, EME Colonel Commandant; Lieutenant-Colonel(Retired) E.J. Wesson, Vice-Chairman, Conference of Defence Associations; Major(Retired) A.M. Adams, President of the EME Association, and; 15 corporate sponsors of the 50th Anniversary Fund. Lieutenant-Colonel Brown acted as PMC.

At noon the next day, the EME 50th Anniversary Steering Committee and the EME Association jointly-sponsored a reception for conference and NDHQ attendees. Approximately 200 people passed through a reception line manned by the Colonel Commandant, Branch Advisor, and Association President. The hotel provided a first-rate lunch and drinks were served by members of the local Militia units.

10. The approximate amounts were; Car Raffle $181,000, Corporate Donations $123,000, Unit Assessments $50,000 and Personal Pledges $214,000. Other revenue, mainly interest, was $50,000.

11. Minutes of the 16th meeting of the 50th Anniversary Steering Committee, Annex E.

12. The logos of many of them are included in the Commemorative Document (see Lindsay, LCol J.G., editor; *50 Years of Canadian Electrical and Mechanical Engineering*; EME Officers' Fund, Ottawa, 1994, pages 112 and 113).

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Colonel(Retired) B.L. Code and the Ottawa chapter did a sterling job in organizing this function.

It was a great way to officially launch "The 50th." However, the Craftsmen had already started celebrating.

The National Weekend[13]

As the home of the Electrical and Mechanical Engineering Branch, CFSEME hosted the 50th Anniversary Celebration National Weekend from 13 May through 15 May 1994 in CFB Borden.[14] This was the major national event of the year. The centre of activities was Vehicle Company's Sergeant Carson building, where the reception centre, displays and the Craftsman's Inn were located. The displays were arranged in several themes - one per classroom - and included vehicles, weapons, FCS and materials technicians as well as peacekeeping and bases. The displays included photographs, historical artifacts and trades demonstrations. Some displays, like blacksmithing, were set up outside. In all over 2,500 photographs were on display. The Craftsman's Inn was the meeting place and lounge area for the weekend, well-sited in the vehicle practical training area.

The many activities reflected all aspects of life while serving as a Craftsman. The weekend activities commenced with the 50th Anniversary Parade. The reviewing officer was Brigadier-General V. Pergat, the EME Branch Advisor. Accompanying him for the review of the troops on parade were the EME Colonel Commandant, Colonel M.C. Johnston, and the EME Branch Chief Warrant Officer, Chief Warrant Officer A.E. Rest. The parade was formed up in four companies; regimental, artisan, vehicle and explosives, and compagnie GEM. The parade commander was Lieutenant-Colonel D.W. Clarke, the commandant of the Canadian Forces School of Electrical and Mechanical Engineering. The parade regimental sergeant-major was Chief Warrant Officer G.M. Clough, regimental sergeant-major of the Canadian Forces School of Electrical and Mechanical Engineering. Other guests of honour included Brigadier J. Graham, ADC, representing the Corps of REME.

Just before the parade got under way and the troops were all lined up, there was what initially appeared to be an awkward delay. However, coloured smoke soon drifted across the parade square and out of it came the skill-at-arms teams[15] on the double to join their fellow Craftsmen on the reviewing line! To the music of the REME Band, it was indeed "soldiers on the square" and proved to be a real crowd-pleaser. The highlights of the parade included a parachute jump, assembly/disassembly of an L5 Howitzer, the "EME Horse," and a roll-past including 21 historical vehicles that EME personnel on base maintain. Of these, five were recovery or machine shop vehicles used by Craftsmen.

After the inspection and march past the intrepid skill-at-arms teams, representing units from across Canada, departed the square first with the arduous task of completing the extremely difficult 50-kilometre course ahead of them. All had originally hoped to finish first in the competition but, halfway through the course (now in the middle of the night) many wondered if they would even complete it. Immediately following the parade a "meet and greet" took place at the Craftsman Inn, which was decorated in a field-orientated motif. This allowed over two thousand former and serving members, and their guests, the opportunity to relive old war stories, invent new ones, renew old friendships and make new acquaintances.

Saturday's festivities opened with a hearty pancake breakfast served from a field kitchen by versatile EME maintainers. Then patrons were encouraged to take a scenic Volksmarch with a 50th souvenir medal being the reward. Throughout the day, an open house captivated the old and young alike with many activities and displays, including everything from a junior craftsman course to a Leopard power pack pull. The Jeep Skill Team added a unique and very entertaining maintenance display that proved to be a favourite for one and all. The REME Band and Vimy Band[16] put on a very popular show. At the end of the afternoon awards for the Skill at Arms competition were presented to the winning teams, with General Pergat praising all teams for their effort, their skill and their esprit de corps. On that basis alone, he said, they were all winners. On a points basis, however, the team from 5e Batallion du service was the winner. The afternoon closed with the drawing for the fifth and last car draw (see page 309).

13. This section is based on an article by Peters, Capt B.A. and Baker, MWO B.G.; *National Celebration Weekend*: EME Journal 4/94.
14. *EME National Anniversary Celebration Weekend*; souvenir program, CFSEME, 1994.
15. The teams came from all across Canada including CFSEME (Borden, Ont.), Air Defence School (Chatham, N.B.), DLES 2-2-3 NDHQ (Ottawa, Ont.), 2PPCLI (Winnipeg, Man.), CFB Chilliwack (Chilliwack, B.C.), 5 Service Battalion (Valcartier, Que.), 2 Service Battalion (Petawawa, Ont.) and Combat Training Centre Gagetown (Oromocto, N.B.).
16. It was one of the last appearances for the Vimy Band which was disbanded that summer as part of defence cut backs in 1994.

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The evening's entertainment included an officers', warrant officers' and sergeants' ball at the Waterloo Officers' Mess. Music for the dinner was provided by the Vimy Dinner Band and, later, by the Vimy Dance Band. Included with the program was a copy of the menu for the Inaugural RCEME Dinner held 18 May 1944 in London, England.[17] Lieutenant-Colonel (Retired) J.K. Bradford attended both dinners! The 50th Anniversary Dinner was sold out with 440 people attending.

Running concurrently with the ball was an all ranks dance featuring two live bands; the Jeff Healy Band and Honeymoon Suite. They kept the guests, numbering over 1400, dancing until the wee hours of Sunday morning.

Sunday was the highlight of the weekend, commencing with the unveiling of the RCEME memorial windows (see page 290) during special ceremonies held at both Base Borden chapels. The day (and weekend) culminated with the dedication of the EME 50th Anniversary Commemorative Monument (see page 281) by Chief of The Defence Staff General J.A.J. deChastelain, Lieutenant-Colonel (Retired) J.K. Bradford representing veteran Craftsmen and Craftsman S.E.W. Facey representing Craftsmen of the future.

Over 2,500 people took part in the various activities over the weekend. The positive comments and heartfelt thanks received from many retired members and other guests can be directly attributed to the hard work of the men and women of the EME Branch who made it happen. This outstanding weekend afforded the opportunity for old and new friends to celebrate in true EME spirit.

The huge success of the weekend was due in large part to the army of workers who planned events, prepared displays, set up stands and marquees, judjed the competition, cooked pancakes, entertained children, ran the displays, cleaned up after and/or were just plain helpful. As one of them noted, "Everyone had two or three jobs," which required massive coordination. But the army of helpers included more than the staff of the School, it also included students on courses at the School (the timing of many courses was set to ensure maximum availability), the EME RMC graduates and a large contingent from EME units throughout Ontario. Most importantly, there was the will by all to work hard, ensure success and have a good time.

National Projects

There were many national projects; including; the final car draw, the skill-at-arms competition, re-dedicating the RCEME Memorial Windows and unvieling the EME 50th Anniversary Commemorative Monument.

The Freedom of the City of Kingston was granted to the Corps of RCEME, its predecessors and its successors on 3 June 1994 as part of the EME 50th Anniversary Reunion of the RCEME Association (see page 288)[18] It was exercised - under the command of Lieutenant-Colonel D.W. Clarke with Chief Warrant Officer M.D. Clough as Regimental Sergeant-Major - by four guards representing the past, present and future of the EME Branch. Leading was the Old Guard under command of Chief Warrant Officer M. Gauthier representing the past. In its ranks were 100 members of the RCEME Association, many of whom had trained at the RCEME School when it was in Barriefield. The second and third guards represented the present and were regular force. The second guard came from the School and was under command of Major S.J. Colling, REME with Master Warrant Officer B.G. Smith as Guard Sergeant-Major. The third guard came from Bases Kingston and Trenton and was under command of Major M.D. Muggridge with Master Warrant Officer R.L. Morgan as Guard Sergeant-Major. The fourth guard represented the future with the cadets of 3018 (LETE) Cadet Corps under the command of Major R. Barrette and 2861 (Windsor) Cadet Corps under the command of Captain D. Schatz.

The ceremony started at 1326 hours when the parade commander knocked on the door of City Hall three times with the hilt of his sword and invited the Mayor, His Worship Kenneth Matthews, to review the parade. Accompanying him were the EME Colonel Commandant, Colonel M.C. Johnston, and the President of the RCEME Association, Master Warrant Officer(Retired) R. Clooney. Attending the ceremony was a large crowd of families, friends and former members of the Corps/Branch. Included among them were three former commandants and one former Regimental Sergeant-Major of RCEME School, Brigadier(Retired) K.H. McKibbin, Colonel(Retired) A.L. MacLean, Colonel(Retired) C.W. Jones and Chief Warrant Officer (Retired) D.N. Campbell.

17. Attending Inaugural dinner was Major-General W.B. Rowcroft, the first Director of the Corps of REME.
18. Freedom of the City; souvenir program, 1994.

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The music for the ceremony was provided by the Vimy Band, making one of its last official appearances before being disbanded as part of the 1995 defence cuts. The RCEME badge was resplendent on the berets of the cadets from Windsor and of the berets of many of the veterans. The EME badge was on the berets of the cadets from Ottawa and the serving EME members. On the 50th Anniversary of the formation of RCEME it was the joining of the past with the present and the future and truly representative of 50 years of EME services!

The **Commemorative Document** was intended to produce a souvenir booklet of about 20 to 30 pages for each serving Craftsman during the Anniversary year. When the call went out for articles the response was overwhelming and came from all ranks. The budget for the project was almost tripled and nearly 10,000 copies of a 114-page book were produced.[19] Titled "50 Years of Canadian Electrical and Mechanical Engineering," it covered all aspects of the life, trades and experiences of Craftsmen from 1944 to 1994. It included a special RCEME 50th Anniversary cartoon by Earl Hodge and a reproduction of the 50th Anniversary Poster. The book was a success due to the hard work of an army of authors, editors and photographers led by Lieutenant-Colonel J.G. Lindsay and assisted, inter alia, by Major D.C. Knight and Captain C.S. Frost. The book drew acclaim from many outside the branch, because, within the confines of a few pages it was able to show such a wealth of variety, depth of detail and humour.

Skill Demonstration Team. An easy and popular way of demonstrating EME skills is the rapid disassembly and assembly of equipment (see page 301). With that in mind the EME 50th Anniversary Skill Team was formed. During a two-and-half-month period during the summer of 1994 the team logged over 21,000 kilometres performing at 12 locations ranging from Edmonton in the West to Chatham in the East,[20] averaging three shows per location.[21] The team members were representative of all trades and bases across Canada.[22]

In most locations the Skill Team reinforced a local EME event or, in the case of air shows, gave EME a bit of unexpected visibility. Often the local EME section had to make a special effort to arrange transport for the team. The minimum disassembly time was 64 seconds and the minimum assembly time was 72 seconds. Whether it was "some assembly required" or the "bandits stealing the jeep from the young lady at the café," the audiences appreciated the light-hearted approach to delivering an important message; demonstrating the skills levels and teamwork of Craftsmen.

From the team members point of view, the continual performance routine (13 hours plus driving per day) and the demands of lifting 650 pounds per show was a constant challenge. The reward was a unique opportunity to see their country while being part of the EME 50th Anniversary.[21]

The EME Display at the Canadian War Museum During the summer of 1994 the courtyard in front of the Canadian War Museum in Ottawa was taken over by a display showing 50 years of EME. The display was opened on June 10th by: Major-General R.N. Fischer, Associate Senior Assistant Deputy Minister (Materiel); Doctor V. Suthren, Director of the Canadian War Museum; Brigadier-General V. Pergat, the EME Branch Advisor; Colonel M.C. Johnston, the EME Colonel Commandant, and; Chief Warrant Officer A.E. Rest, the EME Branch Chief Warrant Officer. The display included six vehicles and a commemorative arch entrance. Volunteer militia soldiers, augmented by NDHQ and 7 Wing EME personnel, under the direction of Master Warrant Officer J.C.F. Jutras were on hand to answer questions or discuss the displays with visitors. An estimated 80,000 Canadians and tourists saw it!

The history of the Corps/Branch was shown through the use of both old and new technology. A Diamond-T Wrecker, used in World War Two and the Korean War, was located beside the new HLVW Wrecker to emphasis the improvements in recovery equipment. The Canadian War Museum's Machinery M-Lorry that was rebuilt by 202 Workshop Depot was also on display. It proved interesting to see the equipment that technicians had in this vehicle compared to that of today's SEV kits.

The hit of the display - An APC just off the rebuild line at 202 Workshop Depot was equipped with additional armour for the crew commander and gun shields for the crew compartment. The 35-foot Leopard FCS trailer used in Europe had been converted into a display case for the current weapons, FCS, and material

19. 9,649 copies in soft cover and 300 copies in hard cover.

20. The 12 locations are; Montréal, Borden, Edmonton, Chatham, LETE, Kingston, Ottawa, Gagetown, Sault Ste Marie, Trenton, Winnipeg, Shilo, and Moose Jaw.

21. Long, Lt G.A.; *Some Assembly Required!*; EME Journal 4/94, page 20.

22. Team members included; Cpl R.J. Beers (CFB Halifax/Winnipeg), Sgt J.A.P. Bigras and Cpls S.R. Clark and M.O. Bennett (CFB Gagetown), Cpl J.J. Parisé (BFC Montréal), Cpl K.N.A. Lawson (CFB Kingston), Lt G.A. Long (CFB Borden/CFB Shilo), Cpl R.A. Willmore (CFB Winnipeg) and Cpl C.L. Clement (11 (Victoria) Svc Bn).

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trades, and former RCEME radio and radar technicians. It included photos and equipment used over the years. The hit of the display with the children was a white Iltis representing the EME commitment to the United Nations. Inside the Iltis was a blue helmet for visitors to wear while having their photo taken.

Tying the entire display together was a tent showing additional photos of all the trades working together throughout the years from World War Two to United Nations tours in the former Yugoslavia. The War Museum display gave valuable exposure to EME services and emphasized their value in operations.[23]

Car Shows. EME displays were prepared for the Department of National Defence displays that were shown at car shows in 1994. The EME displays included HLVW wreckers, the new LSVW truck and static displays of all trades. The show in Vancouver was sponsored by Base Maintenance Chilliwack.

Exhibition Trailers. The Department of National Defence had two 45-foot trailers which were used to tour the country to inform the public of what members of the Canadian Armed Forces did. Inside, collections of displays, video stations, sound and lights welcomed visitors to the trailers.[24] One trailer toured western Canada and the other eastern Canada.

For 1994 it was arranged that each would have a major display of EME. Located at the front of each trailer's entrance, the centrepiece of the EME display was a diorama model of a tank recovery incident that occurred in Northwest Europe in 1944-45. "To ensure accuracy the model was based on actual air photographs and the original (dated 1944) parts lists for vehicles," recall Lieutenant-Colonel D. Wingert and Captain P. Scott of DVEM, who were instrumental in providing information, artifacts and leads for photos. To round out the display there were pictures and equipment demonstrating all four EME trades. To better explain the EME displays the crew chiefs for the trailers were EME technicians, Warrant Officer L. White for the eastern trailer and Sergeant J.A.G. Plante for the western.[25] At summer's end, the trailers were closed down and one, complete with diorama model, was given to the Canadian War Museum.

The M-Lorry. A major equipment refurbishment project was the restoration of the Canadian War Museum's Diamond-T 5-ton M-Lorry by 202 Workshop Depot. A mobile automotive machine shop, it was one of several types of heavy machine shop vehicles used in third-line and advanced fourth-line workshops in the Northwest Europe Campaign.[26] The vehicle had been given to the museum in the early 1950s, but nothing much had been done with it until 1993 when 202 Workshop Depot was tasked to refurbish it. The first step was an engineering study in order to restore it as faithfully as possible to initial vehicle configuration both from a cosmetic and an operational perspective.[27]

The vehicle was completely stripped and parts went to various work centres around the depot. A North American-wide search was required for some missing parts. After 2,000 hours of production the completed vehicle was fully operational and all machinery worked - in 1945 technology. 40 technicians worked on the project, each contributing specialist skills under the guidance of Mr. G. Gillis and Lieutenant P. Bernatchez. The vehicle had two generators. One of them - a 7½ Kilowatt DC generator - was fully restored on a complimentary basis by Godfrey Aerospace Inc. The vehicle was presented back to the War Museum as part of the EME Day Parade in May 1994. During the summer of 1994 the M-Lorry was on display as part of the EME Display on the courtyard of the Canadian War Museum (see page 312).

Commemorative Envelope. Another national project was to have a special commemorative stamp. However, when the application was submitted in early 1992 it was rejected as being too late! Consequently, a special envelope was prepared with cancellations available either from Borden or Kingston and dated 15 May 1994. 3,000 envelopes were prepared for sale in the kit shop as a souvenir.

Commemorative Artwork included the 50th Anniversary Poster, Logo and Set of Four Trades Prints. The initial planning for the celebration included an EME **50th Anniversary Poster** for advertising purposes. This was then expanded to ensure that each serving Craftsman got one. Mrs Katherine Taylor, an Ottawa-based graphic artist and painter who had already produced several regimental collages, was engaged to produce the poster. It was to pictorially show 50 years of EME and, after consulting with the Colonel Commandant and others and reviewing the Branch history, Canada's Craftsmen, she produced a first draft

23. Johnston, Colonel M.C.; *RCEME Storms the War Museum!*; EME Journal 4/94. page 4.
24. Kaine, R.; *Canadian Forces Carnies*; published in *Ubique - The Journal of the Canadian Military Engineers*, No 50, February 1995.
25. *1994 Mobile Display Trailer*; unpublished DND notes, 1995; 490.
26. The EME Museum in Borden has a 60cwt CMP machine shop truck and a 15cwt KL welding truck. These vehicles are typical of the types of workshop trucks found in forward units and brigade workshops.
27. Brely, Captain N.; *The Rebirth of 50 years of History from 202 WD*; Reflexion - le Bulletin mensuel du 202e Dépot d'Ateliers, Spécial 50e, 1994.

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painting of the poster. After being widely-circulated for comments a final painting was produced and accepted. (It is now in the DGLEPM Conference Room in NDHQ). The first showing of the approved poster was in Cyprus that spring when the Colonel Commandant visited the contingent. The resulting 50th Anniversary Poster was produced that fall. The initial 50 copies were taken by Colonel Johnston when he visited Croatia in December and were distributed to members of the Branch serving there at that time. "The 50th" had been taken to the troops in the front line!

The **50th Anniversary Logo** was designed by the Branch Advisor, Brigadier-General R.N. Fischer, in early 1992. It was accepted and quickly appeared on pins, sweaters, mugs, other souvenirs of all kinds and letterhead. The logo was very popular. Early in 1993 the maintainers of CFB Valcartier made a gold lapel pin of it and when the Colonel Commandant visited Cyprus soon after he took one for each maintainer there. Later that fall a coloured enamel pin became available in the kit shop and the Colonel Commandant delivered the first 200 to the troops in Croatia. As with the poster, the 50th pins had been taken first to the troops in the front line! The 50th Anniversary pins were widely-distributed and, along with the poster, became the visible symbols of the 50th.

The early planning for the Anniversary included a set of four trades prints representing the four trades, with the prints sold as sets or individually. Colonel (Retired) G.G. Jamieson, a former Canadian Armed Forces medical doctor and well-known military artist, was engaged to produce a set of four paintings, one of each of the trades in action in the field. 600 sets of prints[28] were made from these paintings for sale in the kit shop.

Local Celebrations

The 50th Anniversary was celebrated locally in many ways. There was a double theme of simple camaraderie and pride in accomplishment that ran consistently throughout these events. It revealed a unity in the Branch which had started 50 years earlier on the formation of RCEME. It also revealed a "thinking on your feet" ingenuity,[29] which is another trademark of Canada's Craftsmen and so vital in supporting operations in the front line.

On the West Coast, Comox and Esquimault combined for an EME day in early May. The guest of honour was Colonel (Retired) B.L. Code. After the parade a ¾-ton truck refurbished by CFB Esquimault Workshop was presented to the 11 Service Battalion museum. Captain (Retired) F. Chess presented three museum display cases to the museum. These cases had been restored by the museum committee of the Victoria Chapter of the EME Association and contained many EME artifacts collected by committee members. 140 attended the dinner-dance that evening.

In Edmonton, there was a sports day featuring a junior-senior ball game and creeper and tire relays followed by a dinner in the evening complete with a pre-recorded video message from the Colonel Commandant. The Western Bonspiel was the first western event of the year. It was held at 18 Wing, Penhold just before that unit closed. In addition, 15 (Edmonton) Service Battalion presented a specially-prepared copy of the 50th Anniversary Poster to Royal Canadian Branch #7 in Blairmore, Alberta. This presentation was in recognition of the past service of 31 Technical Squadron RCEME, which had been located in Blairmore (see page 255).[30]

In Calgary the RCEME Association of Alberta combined with the maintenance company to host a EME reunion. There were many historical displays set up. Over 300 people attended the Saturday dinner. The guest of honour, Brigadier-General (Retired) J.I. Hanson, gave an inspiring speech. The next day he officiated at the dedication of two memorial windows in the Museum of the Regiments. One features an EME Badge and the other a RCEME Badge. The theme for the weekend, "Pride in the Past, Faith in the Future," reflected celebrations all across the country.

In Moose Jaw the corporals beat the master-corporals, senior NCOs and officers at baseball. A fine buffet, prizes, EME wine and courtesy busses completed the day.

The whole EME regular and reserve in the Winnipeg/Lakehead area combined for several events over the summer. A parade, sports day and dinner-dance was held in mid-May and an open house with static

28. 150 numbered and 450 unnumbered sets.

29. Lussier, Cpl J.; *Canada's Craftsmen Celebrate 50th Anniversary*; CFB Halifax *Trident* and 12 Wing *Shearwater Warrior*, 1994.

30. Edwards, LCol G.L. and Pinkey, Maj J.M.; letters to the Legion Branch's president, 1994-95. The presentation was made on November 11th by Major Pinkey, Officer Commanding the Battalion's Maintenance Company, who had started his military career with 31 Technical Squadron in Blairmore in 1957.

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displays in June. The jeep skill team attended the Red River Exhibition at the end of June. In September there was an all ranks mess dinner attended by 125 Craftsmen, including the Colonel Commandant and the Branch Chief Warrant Officer. In November a special memorial service was held with RCEME veterans.

In North Bay the Wing Commander reviewed the 50th Anniversary Parade. This was followed by a ball game with the Junior NCOs winning and a barbecue at which farewell was said to several departing members.

In Toronto there was a parade with guests of honour Lieutenant-Colonel and Mrs A. DeMaio. Colonel DeMaio had been the CREME 1st Canadian Division in World War Two.

The RCEME Association's Annual Reunion in Kingston featured the Freedom of the City Ceremony. Over 500 people attended the annual dinner dance on the Saturday. The Branch Advisor, Brigadier-General V. Pergat, was the guest speaker. There was a memorial service at the RCEME Gates the next morning officiated by the Reverend Don Chisholm and, as part of the service, his wife Helen spoke on the contribution of families to EME life (see page 304). After the service the Vimy Band played for the march past. General Pergat took the salute.

In Petawawa, the celebration began with the first 100-rink EME Bonspiel (see page 300). The celebrations started in earnest at the end of May with the arrival of 16 "EME roadrunners" from Borden bearing a special commemorative scroll. On June 2nd there was a golf tournament and dinner at which the Branch Advisor was the guest of honour. On June 3rd all EMEs in camp paraded for the base commander, then unveiled a restored M62 wrecker in front of the maintenance company's Sergeant Hurry Building. The wrecker was unveiled by Mr. Cecil Piquette who served 21 years in RCEME and 21 years as a civilian mechanic with Maintenance Company and had used that wrecker for many years. The day continued with sports and a barbecue at the beach and concluded with a dinner dance. The celebration concluded on Sunday with a family fun day.

In Longue Pointe all the Montréal and St-Jean area EME units combined for a very large 50th Anniversary Parade on May 10th. There were about 150 Craftsmen on parade and the Colonel Commandant, Colonel M.C. Johnston, was the reviewing officer. As part of the Parade, 202 Workshop Depot presented the refurbished M-Lorry to the Canadian War Museum (see page 313). After the parade there was a two-day sports competition.

Chatham and Gagetown combined for an EME 50th Anniversary Parade held in the Combat Training Centre on May 6th. There were about 150 Craftsmen on parade and the reviewing officer was the Colonel Commandant. A highlight of the parade was the presentation of an M62 wrecker - restored by the Maintenance Company - to the Centre's Commander, Brigadier-General B. Stephenson. The afternoon was a sports day with a tabloid of EME workshop sports. In the evening there was an all ranks dinner dance attended by the Colonel Commandant and his wife.

The next day they went to the field to visit the maintenance company of 2 Service Battalion and maintenance troop of the Royal Canadian Dragoons, who were training for their forthcoming duty in the former Yugoslavia and, because of previous inclement weather, could not come into camp to join the Anniversary parade. The first call was to maintenance company to cut an EME Birthday cake and enjoy a barbecue even as a bit of work was going on. The second call was a bit tricky since the RCD were conducting an advance to contact exercise. With a bit of judicious timing, the colonel and his wife joined the advance, visited an MRT, passed along through an advancing squadron and arrived at the maintenance troop area where they met members of the troop at work.[31]

Base Maintenance Halifax and Shearwater combined for a 50th Anniversary parade. The reviewing officer was Lieutenant-Colonel J.E. Morrison, the G4 at Land Forces Atlantic Area Headquarters while the guest of honour was Mr. H. Colquhoun, a former Craftsman who had rebadged to RCEME when the Corps was formed. After the parade there were tabloid indoor sports because of the rain. In Greenwood there were indoor sports too for the same reason.

In Gander EME section 9 Wing unveiled their new section sign and then went to St-John's to join Maintenance Company 36 Service Battalion and Station Maintenance section for a group photo and an afternoon of sports (won by Gander). That evening there was a barbecue and a visit to HMCS Fredericton.

In Canadian Forces Europe a series of events marked the 50th Anniversary and the closeout of Lahr.

31. *The Royal Canadian Dragoons - Springbok 1994*; RCD Yearbook, 1995, pages 38-40; 503.

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The year began with a final funspiel. In March, Team Bold refurbished the Canadian Memorial Tank at Coursuelles-sur-Mer in Normandy (see page 290). The EME Day parade was also the closure of Base Maintenance Land. The reviewing officer was to have been the Branch Advisor, Brigadier-General V. Pergat, but he was delayed in Bosnia. So the Base Commander, Colonel L. Corbett, reviewed the parade. The Benoit Trophy was presented for the last time, to Corporal A.B.T. Lewis, and for the last time the EME flag was lowered. The RCEME/EME flag had flown continuously in Western Europe since 1951. After the parade was the traditional sports day. On Saturday, April 14th the EME family with spouses, 90-strong, gathered one last time in the main room of the Friesenheim Gasthaus for a nostalgic evening and dance. Several retired members of RCEME who lived in the area joined in too. The EME 50th Anniversary events concluded with an EME-hosted happy hour for all ranks on May 13th. All guests were greeted with a "maintainers" reception line.

In Visoko the "Olympics of Visoko" (see page 177) were held and in the Golan Heights the EME Flag was flown on Mount Hermon (see page 148).

The unit celebrations of the EME 50th Anniversary revealed a consistency among Craftsmen. They do things in teams, take pride in precision and like simple, homey things. The year was also a watershed, as many bases were being reduced or closed and many Craftsmen were taking their release as the Canadian Forces started major reductions and some units were being redesignated. The Anniversary cushioned many shocks which were revealed as the year ended as a poet at the EME officers and senior NCOs mess dinner at 32 (Moncton) Service Battalion noted in the following ditty:[32]

"From RCEME to EME, and all points in between;
For the past 50 years we have been on the scene.
Regardless of what badge in the future may come;
Remember your roots and where you come from."

32. Sentell, Col(Retd) D.P.; letter to the author, 1995.

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22

Chapter 22 - CHANGE AND THE FUTURE

As this century started, armies had simple equipment to help soldiers fight. The organizations tasked to supply and maintain this equipment were very rudimentary. Now as the century closes armies are heavily dependent on technically advanced, powerful equipment which is at the leading edge of technology. To keep this equipment operationally fit requires a comprehensive, extensive, well developed maintenance system using up-to-date tools, training and techniques.

For Canada's Craftsmen it has been a century of continual change.

Change - a historical survey[1]

The century began with the introduction of recoil mechanisms with hydraulic buffers into gun design. The subsequent improvements to accuracy, flexibility and rate of gunfire required more maintenance resources. World War One began with attacks by cavalry and foot soldiers over open ground. This led to appalling loss of life to machine gun fire. To save lives, Colonel A.G.L. McNaughton introduced mathematically-calculated artillery barrages. This led to "rolling barrages" which moved ahead of advancing soldiers, giving them a better measure of protection. The availability and accuracy of guns to fire these barrages became a decisive matter in the outcome of battle. To ensure the availability and accuracy of guns, a regular schedule of buffer maintenance and bore measurements was required. This had to be done close to or in battery locations, because to move guns back for maintenance would have kept them out of action too long. Hence workshop trucks and artificers were stationed at the front.

During the 20-year interwar period the minuscule size of the Canadian Armed Forces severely limited advances in equipment design. Advances, such as they were, were aimed at increasing the mobility of soldiers. For example, guns were mounted on pneumatic tires, and trials in the mid-1930s experimented with military truck designs.

The eve of World War Two found Canada, like many of her allies, trying to make up for years of neglect. Re-equipment and mechanization were in progress, and many units had been mobilized, but they were preparing for the trench warfare of thirty years before. The basic concepts for repair and recovery evolved during World War One to include three lines of repair, LADs attached to units, and mobile workshops at divisional level and higher. However, the organizations and establishments were geared for World War One, i.e. semi-static trench warfare and the lower degree of mechanization.

As a result, the blitzkrieg of 1940 overwhelmed the allies. It was heavily dependent on mobility, firepower, and control of large quantities of technically-advanced equipment. Success depended on keeping all of this equipment operationally fit. A major contributing factor to success was having rapid recovery, repair and replacement capability with the forward troops. The British Army adopted this concept, and used it successfully at the Battle of El Alamein. The Canadian Army adopted the British organization in 1943.

During World War Two, the functions of design, procurement and maintenance of equipment were carried out separately. The main thrust of the Engineering Branch of the RCOC (later RCEME when it was formed in 1944) was maintenance, i.e. repair, recovery, and modification of in-service equipment. The Director of Electrical and Mechanical Engineering (DEME) was responsible for the maintenance of the army's equipment and for many personnel functions for members of the Corps.

Design and procurement was part of the Department of Munitions and Supply which had been formed in 1940 to produce equipment and allocate resources. At the end of the war, this department was closed down and the Department of Defence Production was set up to take on its procurement functions,

1. Johnston, Col M.C.; notes for a presentation to the EME Common QL7 Course 9501; February 1995.

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while DND took over its design functions.

World War Two ended at the threshold of nuclear war. Vast armies returned to civilian life. Enormous amounts of equipment were destroyed or left to rot. But peace was not to be. The world was soon caught up in the Cold War and in a continuing series of local crises and small wars, which the United Nations tried to resolve. Canada was soon called upon to provide troops for NATO and a series of peacekeeping operations.

The start of the Cold War led to a rapid build-up of the Canadian Forces as a deterrent. A new arms race started, adapting the latest technology into weapons systems. These improvements made use of electronics, computers, infra-red etc. Keeping pace with new developments led to radical changes in the old trades.

Most RCEME officers and other ranks worked in maintenance functions, where the main thrust of their work was keeping the large quantities of World War Two equipment operationally fit. A few officers with engineering degrees worked in design functions.

For an extended period in the mid-1960s and 70s, the control and definition of functions were changed and moved about. For Canada's Craftsmen, however, it was an unsettling period of uncertainty, in which the loss of RCEME and the RCAF MSE overshadowed the turf wars of who was in charge of what. During this period the Department of Defence Production was disbanded and some of its procurement functions were transferred to DND.

At this time, the last of the wartime equipment was being replaced with new, higher-technology equipment, that was staying in service longer and was being continually upgraded. There was a need for increased design and procurement activity. Consequently, the design, procurement and maintenance of all Canadian Forces land equipment became the responsibility of the Director-General Land Engineering and Maintenance (DGLEM). However, he only retained an advisory responsibility for the personnel functions of the former DEME.

At the start of the 1980s there was a great increase in the demand for specialist design, procurement, and program management skills. This gave rise to a shift in emphasis in the EME Branch, from solely maintenance to maintenance including program management for procurement. This led to an increase in senior officer and senior warrant officer positions in NDHQ - with a resulting loss in maintenance experience.

When the Cold War ended at the start of the 1990s, this had the effect of unleashing destabilizing forces, which soon lead to the Gulf War, Somalia, and the struggle in the former Yugoslavia. The result has been an increase in the number and intensity of peacekeeping missions. The demand to reduce costs yet increase peacekeeping activity has put the Canadian Armed Forces in a terrible dilemma.

1994 was a watershed year for the EME Branch. An excellent 50th Anniversary celebration forecast a rosy future. Yet personnel reductions, recession, prospect of another the defence budget with more resource reductions and reorganizations put a cloud of uncertainty on the future. The success of 1994 has been tempered by concern about the future.

The Future

Canada has a reputation of advanced technology and competence with no hidden agenda of increasing power or influence at the expense of other countries. Consequently we are a popular choice for peacekeeping. For forty years, we have kept the peace as observers or provided communications, maintenance, supply and transport in what were essentially low intensity operations. At the same time Canadian Forces Europe were part of NATO and helped deter nuclear war.

The future probably is not global war. But we should be prepared to continue providing heavily-equipped combat units in high-intensity operations. How should EME fit into such a scenario? The answer can be looked at in terms of EME identity, focus, skill and need.

EME Identity. At the start of the century, what would today have been the EME Branch was a very small part of the Ordnance Stores Department which itself was a very small part of the Canadian Army. By the middle of World War Two the Engineering Branch of the RCOC comprised two-thirds of a very large Corps.

In 1944, the Engineering Branch of the RCOC became the newly-formed Corps of RCEME.

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Canada's Craftsmen had been given their separate identity as a technical corps in the Canadian Army. For 51 years we have steadfastly clung to that separate identity, because it promotes the esprit-de-corps and a sense of belonging, which give us a willingness to do a difficult job under dirty, dangerous conditions and do it well.

Prior to the introduction of service battalions, maintenance was a clearly-identifiable function. Today, maintenance is looked on as part of combat service support. But CSS is a from-the-back-to-the-front support function. Mobile repair and recovery teams, however, are in the "minefields" with the front line soldiers and take the same risks. EME is often looked on as just another CSS function. It isn't, because of its front line responsibilities. It may be CSS, but it's CSS with a difference!

EME Focus. When RCEME was formed in 1944 its focus was maintenance. This focus remained until Integration and the start of program management. In 1994 only 85% of the EME Branch's effort is maintenance, while most of the remaining 15% is design and procurement. There is a danger here. A very significant part of the Branch's senior officers and senior NCMs are focused on design, procurement and program management in NDHQ, which reduces their exposure to the vast majority of the troops who are focused on maintenance. From a Branch leadership point of view this has important implications.

During the 1970s, increasing project management required the Branch to fill many more technical positions than it was established for. Consequently, the Branch was not able to fill as many "open/any" positions as previously. This has led to a focus on technical specialization and a shift away from operations.

EME Skills. Throughout this century the continuing rise in technology has been a major factor in how war has been waged. The increased firepower and mobility of equipment has lead to the replacement of the tactics of mass attack used in World War One by the highly-mobile widely-dispersed tactics of the nuclear age. Officers and NCMs who are highly-skilled in maintenance, design and procurement are required to get and keep this equipment operationally fit.

World War Two workshops had little worry about rear area security. Today, attack by helicopter-borne soldiers in the "communications zone" is a major consideration for combat service support units. Canada's Craftsmen must also have soldier skills.

The need for EME. "Contracting out" promises great financial savings. But at what cost? In Yugoslavia the near-war conditions involved high risks, no doubt affecting the competitiveness of wages that had to be paid. If too many positions are lost to "contracting out", will there be enough "shore" positions to give a couple of years between UN postings? 1 Service Battalion returned from Yugoslavia in early 1994, and went back in mid-1995. Even though only a portion of the unit went to Yugoslavia on the 1994 tour, some had to return eighteen months later.

When Canadian troops went to Yugoslavia in 1992, the two regimental battle groups took only a total of 60 EMEs in order to maximize the number of "bayonets." Later there were 200 EMEs, 10% of the Canadian contingent. As well, additional EMEs were sent over for limited periods to help clean up the repair backlogs. We can only conclude that EME tradespersons will be required for the field force, including UN operations. That, plus a "ship to shore" ratio, will define the total needed in the Canadian Forces.

Summary

Up until the end of the 19th century wars were fought "man-to-man." Any equipment used was relatively simple, and did not require a major maintenance effort. Today the opposite is true. Many soldiers fight by serving weapons. Armies are very dependent on highly technical equipment requiring significant maintenance resources.

EME is technology driven. As technology has advanced there has been continual change in organization, technical skills needed, numbers of people and repair methods. Consequently, change has been - and will continue to be - a constant factor for EME organization, trades and way of doing business.

Ten years ago I noted, "the 1980s are the LORE decade." They were - as shown by the success of the 50th Anniversary celebrations last year. We must continue to be dynamic and forward looking, responsive to our tasks, flexible in our organization, progressive in our procedures and ever conscious of our most valuable asset, Canada's Craftsmen.

To survive as a Branch, we must continue to provide a unique and vital function as part of Canadian Forces operations. Our image must always be the mobile repair or recovery team commander with his/her

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team members out in the forward areas doing a difficult and dirty job under dangerous conditions - and doing it well, no big deal. If we do that, then commanders can continue to be confident that when equipment fails or is lost they can "call on the RCEMEs!"

It must always be engineering with a difference - by skill and by fighting, par l'adresse et par le combat, Arte et Marte.

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EPILOGUE

The original Canada's Craftsmen took ten years to write and was published forty years after the formation of RCEME. It has proven to be an excellent tool for introducing new members of the Branch to the rich history of RCOC (E), RCEME, and LORE. It has served me well as a ready reference during my tenure as Branch Chief Warrant Officer.

Canada's Craftsman at 50! brings the story of our Branch up to date. It has also filled in some gaps in the first 40 years. Colonel Johnston's superb writing and editorial skills are as evident here as they were in the original book. They have shown subtle improvement not unlike the aging of premium wine. The difference is that good wine is expensive but Colonel Johnston, as usual, has not billed the Branch for his services.

The epilogue written for Canada's Craftsmen covers the first 40 years and need not be repeated here. There is, however, one point that must be challenged. Chief Warrant Officer Lowe lamented that modern technology and repairs by commercial contract had led to erosion in the quality of work produced by today's Craftsmen. I am happy to report that this has not been my experience. Expedient repairs are more difficult to perform but today's craftsmen remain resourceful and inventive. Brake calliper bolts manufactured in the field by the unit's materials technician returned a main battle tank to service. A set of substitute carbon brushes, hand shaped by a fire control systems technician, repaired a 40-year-old generator. A vehicle technician completed major hydraulic repairs on a bridge layer during a NATO exercise, using circuit blue prints his technical knowledge and substitute components from a dissimilar valve block. Craftsmen deployed around the world on operations continue to win praise from operational commanders for their ability to complete repairs under difficult and dangerous conditions.

The skills of our craftsmen are also prized by other government departments. Vehicle technicians employed at isolated Canadian embassies carry the plumbing, refrigeration, gas, and electrical repair load in addition to their traditional roles. Spare parts are not always available, and expedient repairs are routine. During my two year tour, I spent countless hours repairing components with the materials at hand. Repairs ranged from making contact points for washing machine timers, to repairing torn pump diaphragms with nail polish. I left my embassy job with the firm belief that, if someone assembled a piece of equipment, there was always a method available to repair it when it failed.

1994 was a very successful year for the EME Branch. The 50th Anniversary activities produced two major benefits. They provided several opportunities for craftsmen to join together in celebration and friendly competition. They also raised the profile of our branch in a most positive manner.

A.E. Rest
Chief Warrant Officer
EME Branch Chief Warrant Officer
December 1994

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POSTSCRIPT

Many things have changed in ten years and this book documents many of them. Two have special importance for the future. The Branch has been renamed by dropping the word 'Land' to become the Electrical and Mechanical Engineering Branch. This emphasizes our role of providing EME services in all environments; land, sea, and air. We are the 'Electrical and Mechanical Engineers' of the Canadian Forces. DGLEM, Director General Land Engineering and Maintenance, has been replaced by DGLEPM - Director General Land Equipment Program Management. This change is more than cosmetic; it was spurred by a need to fundamentally change the way in which we (the CF) do business. This has meant a significant shift from engineering and maintenance to encompass all of the equipment program management (EPM).

The EPM concept is focused on full life-cycle equipment system management with a single end-to-end process and decision making. Finance, procurement, supply, repair and overhaul, and administration are imbedded into each directorate. Directorates operate under a flexible management, teaming structure with emphasis on generalists versus specialists.

The reduction in the number of EME personnel within the CF as well as the different skill sets required mean that the career pattern of EME personnel could dramatically change. Already Branch appointments have begun to change. The Branch Advisor will become a colonel and the appointment of Branch Chief Warrant Officer is now a secondary duty. Training requirements will also change to fulfil the requirement for engineering, maintenance, supply, procurement, and financial skill sets.

Although the composition of DGLEPM has greatly changed, it is still the home of the EME Secretariat. Our Regimental home remains CFB Borden where both our museum and the Canadian School of Electrical and Mechanical Engineering are located.

Change is inevitable and, even as I write this, more change is on the way with the redesign of command and control structures within the CF. As you can imagine, change as radical as this will have a major impact on the EME Branch. This has been recognized and the Branch has initiated the development of an EME Branch Strategic Plan. This plan will chart the future and the changes that EME needs to make in order to keep pace and remain on the forefront of equipment system management during the 1990s and beyond and to continue to provide EME services wherever the action is.

Arte et Marte.

J.J.R. Marleau
Brigadier-General
Director General Land Equipment Program Management
and EME Branch Adviser
31 August 1995

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APPENDIX 1
PERMANENT ACTIVE MILITIA/REGULAR FORCE
MAINTENANCE UNITS 1907-1966

	PERMANENT ACTIVE MILITIA 1907-1939		REGULAR FORCE 1944-1966		
LOCATION	**MILITARY DISTRICT**	**ORDNANCE COMPANY**	**COMMAND**	**RCEME COMPANY**	**RCEME WORKSHOP**
London	1		Central	1	
Toronto	2	X		2	206
Kingston	3	_		3	207
Picton					207
Ottawa		_			208
Petawawa		_		14/8	209
Borden				15	205
Montréal	4		Québec	4	226
Québec	5			5	203
Valcartier					234
Halifax	6	_	Eastern	6	200
St-John	7			7	201
Gagetown					222[1]
St-John's				19	
Winnipeg	10	_	Prairie[2]	10	213
Shilo					212
Rivers					221
McDonald					222[1]
Regina				12	211
Ft Churchill				18	223
Vancouver	13		Western	11	214
Vernon					218
Chilliwack					216
Esquimault	11	_			217
Calgary				13	215
Edmonton					224
Wainwright				20	229
London			DEME	17	204 Base
Hagersville					228
Montréal					202 Base
Whitehorse			NWHS[3]	16	219
Ft Nelson					220

1. 222 was first assigned to McDonald then on its closure to Gagetown.
2. In 1959 Prairie Command became part of Western Command
3. The Northwest Highway System closed in 1964.

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APPENDIX 2
NONPERMANENT ACTIVE MILITIA/RESERVE FORCE/MILITIA
MAINTENANCE UNITS[1]

LOCATION	1930 (NPAM) ARMY FIELD WORKSHOP	1948 RCEME (RF) UNIT	1950 (RF) TECH REGT	1950 (RF) TECH SQN	1957 TECH SQN	1964 TECH SQN	1970 TECH SQN	1977[2] SVC
Victoria	5	_		40				11
Vancouver		_	8			49	49	12
Vernon		_						
Trail		_						
Blairmore				1/39[3]	31[4]			
Calgary	6	_	9	39	39			14
Edmonton		_		38	38	38	38	15
Lethbridge		_		32	32			
Drumheller								
Saskatoon		_		37	37	37		
Moose Jaw		_		36				
Regina		_						16
Yorkton		_						
Winnipeg		_	7			48		17
Thunder Bay				35		35		18
Sault Ste Marie				34		34		
Sudbury		_		33		33		26[5]
North Bay						39		
Windsor		_	6			32	39	21
London	1							22
Kitchener				31				
St Catherines		_		30	30	30		
Hamilton		_	5			47	47	23
Toronto	2	_	4	45 & 46	45 & 46	45	45	25
Oshawa		_		29				
Peterbourough		_		28	28	28		
Belleville				27				
Kingston	1 Ord Wksp Coy							
Ottawa				26				28
Montréal	3, 1AA Gp Coy		2, 3	43 & 44	43 & 44	43		51
Arvida				25	25	25		
Sherbrooke		_		24				
Sorel				23				
Trois Rivières				22	22	22		
Québec		_	1	42	42	42	42	55
Beauport								
St-John		_						31
Moncton		_		21	21	21	21	32
Halifax	4	_		20	20	20	20	33
Sydney		_						35
St-John's								36

1. RCEME Quarterly 1/1 and 2/3 and RCEME Technical Bulletin 15/1.
2. By 1982 all Service Battalions had a formed or ad-hoc maintenance element.
3. In 1948 the unit was 22 Armd Wksp. In 1950 it was 1 Rec Tp of 39 Tech Sqn. By 1957 it was 31 Tech Sqn, presumably after Kitchener was closed sometime between 1950 and 1957. By 1964 the unit was closed and the number retired.
4. Pinkney, Maj J.M.; letters to the author plus 1 photo, 1995.
5. Headquarters of 26 Service Battalion is in North Bay. The Maintenance Company is in Sault Ste-Marie.

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APPENDIX 3
SENIOR APPOINTMENTS (with year of appointment)

Colonel Commandant	Branch Adviser[1]	Branch CWO
	1936 Col N.C. Sherman	
	1941 Col H.G. Thompson	
	1942 Col G.M. Grant	
	1944 Col R.L. Franklin	
	1944 Col H.G. Thompson	
1946 Gen A.G.L.	1945 Col J.W. Bishop	1946 WO1 W.G. Collins
	1948 Col C.R. Boehm	
	1952 Col J.R. Dunlop	1956 WO1 R.S. Brennan
	1957 Col R.A. Campbell	
	1962 Col A. Mendelsohn	
	1964 Col K.R. Ward[4]	1966 WO1/CWO D.N. Campbell
	1965 Col A.L. Maclean[4]	
	1968-73[6]	
	1973 BGen A.M. Reid[7]	
1975 Col A.L. MacLean	1974 BGen E.B. Creber	1976 CWO L.G. George
		1978 CWO W.A. Best
1979 BGen A. Mendelsohn	1979 BGen R.B. Screaton	1980 CWO T.D. Jones
1983 Col G.W. Bruce	1982 BGen J.G.R. Doucet	1982 CWO G. Lowe
		1985 CWO J.A.L. Levesque
1987 Col W. Svab	1986 BGen J.I. Hanson	1986 CWO J. Sloan
		1988 CWO R.E. Roy
	1990 BGen R.N. Fischer	
1991 Col M.C. Johnston	1993 BGen V. Pergat	1991 CWO A.E. Rest
	1995 BGen J.J.R. Marleau	1995 CWO W. Devlin
	1995 Col G.A. Walsh[8]	

1. This list includes those holding the appointments which are the predecessors of the Land Electrical and Mechanical Engineering Branch Advisor. The list, therefore, represents a succession of senior RCOC(E), RCEME, LORE, LEME and EME Officers in Canada from 1936, when Colonel N.C. Sherman became the Chief Ordnance Mechanical Engineer.
2. Because of rapid wartime expansion and the departure of Colonel Thompson for North Africa the function was filled on an interim basis by Lieutenant-Colonel G.W. Beecroft as Acting-Chief Ordnance Mechanical Engineer When this office became the Directorate of Mechanical Maintenance a civilian director, Mr F. Farwell, was first appointed. He was succeeded by Colonel Grant.
3. On the formation of RCEME in 1944 until 1973, the appointment was entitled, Director Electrical and Mechanical Engineering (DEME).
4. General McNaughton served until 1962.
5. During this time due to major changes in National Defence Headquarters, the commandants of the Corps Schools were given the appointment of Head of Corps. When the School was moved to Borden in 1970, Colonel MacLean retained the appointment until his retirement.
6. During this period as a result of Unification and Integration the responsibilities of the appointment were changed many times. As a result at any one time several officers fulfilled parts of the appointment including: Brigadier-Generals K.H. McKibbin and A. Mendelsohn, Colonel J.C. Boughton and Lieutenant-Colonel G.W. Bruce. The matter was not settled until the implementation of the Branch Advisor system in 1973.
7. From 1973 to 1995 the Director-General Land Engineering and Maintenance filled the position.

8. In 1995 the rank level was capped at Colonel and the Director of Land Resources Management was appointed.

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APPENDIX 4
1 CANADIAN BASE WORKSHOP
STRENGTH, MANHOURS EXPENDED AND PRODUCTION DATA

		1944		1943		1942
STRENGTH	Officers	60		40		60
	Artificers	60		50		20
	Tradesmen	2,470		1,630		1,150
	Non Tradesmen	510		380		470
		3,100		2,100		1,700
MANHOURS EXPENDED	Production	3,100,000	(54%)	1,900,000	(44%)	
	Overhead	800,000		00,000		
	Regimental	900,000		800,000		
	Training	300,000	(5%)	400,000	(9%)	
	Other	500,000		600,000		
		5,800,000		4,200,000		
PRODUCTION	Tanks, AFV	3,000		2,000		
	Vehicles	8,000		8,000		
	Engines	10,000		7,000		
	Vehicle Components	51,000		30,000		
	Guns	2,000		2,000		
	Small Arms	25,000		11,000		
	Electrical	125,000		66,000		
	Telecommunication	39,000		11,000		
	Instruments	11,000		8,000		
	Tires & Tubes	22,000		25,000		
	Machining jobs	54,000		30,000		
		350.000		200.000		

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APPENDIX 5
RCEME UNITS AND ASSOCIATED FORMATIONS OF
1ST CANADIAN ARMY AND 21 ARMY GROUP
NORTHWEST EUROPE AND ITALY--WORLD WAR TWO

Div HQ	1 Inf-CREME	2 Inf-CREME	3 Inf-CREME	4 Armd-CREME	5 Armd-CREME
Div Recce Regt	4 (4PLD)-68	8 (14CH)-20	7 (17DYRCH)-62	29 (SAlta)-42	3 (GGHG)-56
Fd Regt	1-7[1]	4-19	12-32	15-44	17-58
Fd or (SP) Regt	2-8	5-22	13-33	23(5P)-104	8(5P)-81
Fd Regt	3-9	6-24	14-34		
Div Atk Regt	1-13	2-69	3-35	S-45	4-76
Div LAA Regt	2-2LAA	3-3LAA	4-4LAA	8-8LAA	5-5LAA
Div Fd Pk	2-15	1-23	3-30	6-46	4-77
Div Sigs	1-14	2-21	3-31	4-49	5-57
Div MG Bn[2]	Sask Ll-5186	Tor Scot-4187	CH of 0-5216		
Div Mot Bn				Lake Supr-47	Westmnstr-72
Inf Bde HQ	1-BEME, 1	4-BEME, 16	7-BEME-36	10-BEME, 48	11-BEME, 73
Inf Bde HQ	2-BEME, 2	S-BEME, 17	8-BEME-37		12-BEME,[3] 68
Inf Bde HQ	3-BEME, 3	6-BEME, 18	9-BEME-38		
Armd Bde HQ	1-DADEME	2-DADEME		4-DADEME	S-DADEME
Armd Regt	11 (Ont R)-59	6 (1H)-54		21 (GGFG)-75	2 (LDSH)-53
Armd Regt	12 (3 Rvrs)-60	10 (FGH)-55		22 (CCG)-84	5 (8CH)-70
Armd Regt	14 (CalgR)-61	27 (5herb)-85		28 (BCR)-41	9 (BCD)-71
Inf Bde Wksp	-1	-4	-7	-10	-11
Inf Bde Wksp	-2	-5	-8		-12 [3]
Inf Bde Wksp	-3	-6	-9		
Armd Bde Wksp	1[4]	2[4]		4	5
Corps HQ	1-DDME	2-DDME	Army HQ	1-DDME	
Corps Tps HQ	1-CREME	2-CREME	Army Tps HQ	1-CREME	
Armd C Regt	1 (RCD)-74	18(12 ManD)-40	Armd Del Regt	25 Cdn-43,88	
Atk Regt	7-67	6-82	APC Regt	1 Cdn-123	
Svy Regt	1-26	2-52	Army Fd Regt	11-11	19-12
LAA Regt	1-1LAA	6-6LAA	Med Regt	1-10	3-90
Corps Fd Pk	9-51	8-95	Med Regt	2-89	4-91
Corps Sigs	1-50	2-94	Med Regt	5-66	7-28
Corps Tps Wksp	-1	-2	Rocket Bty	1 Cdn-131	
Rec Coy	-1	-2	HAA Regt	2-2HAA	
			Army Fd Pk	10-93	11-25
			Army Sigs	1-126	
Cdn Sec 1 Ech Gp 21 Army Gp			Radar Bty	1 Cdn-1 Rdr Bty	
2, 3 Bn RCE-29, 92		Army Tps Wksp	_1		
1 L of C Sigs-125		Rec Coy	3		
-1, 2 Adv Base Wksp					
-1, 2 LofC Telcom Wksp		Third Line Wksps--1 Gen; 1, 2, 3 Inf Tps;			
-1 Mob Tire Unit, -2 Cdn Engr Eqpt Wksp		4, 5 Armed Tps; 1 & 2 Tk Tps, 1 Engr Eqpt			
-1, 2 Cdn Port Wksp		plus 1 Svcing Unit			

1. LADs and AA Regt Wksps are listed with their units, (e g 1-7 means 1st Fd Regt, 7 LAD)
2. Div MG Bn LADs were renumbered, both are shown.
3. 12 Inf Bde was in Italy only.
4. 1 and 2 Armed Brigades were independent brigades and not part of infantry divisions.

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APPENDIX 6
WINNERS OF THE
WILLIAM LENNOX THOMPSON MEMORIAL TROPHY

1967-75 - Best Militia Maintenance Unit

1967	-	28 Technical Squadron - Peterborough
1968	-	25 Technical Squadron - Arvida
1969	-	49 Technical Squadron - Vancouver
1970	-	45 Technical Squadron - Toronto
1971	-	49 Technical Squadron - Vancouver
1972	-	45 Technical Squadron - Toronto
1973	-	21 Technical Squadron - Moncton
1974	-	49 Technical Squadron - Vancouver
1975	-	45 Technical Squadron - Toronto

1976-83 - Militia Service Battalion with the highest level of maintenance efficiency[1]

1976	-	25 (Toronto) Service Battalion
1977	-	25 (Toronto) Service Battalion
1978	-	55 (Québec) Service Battalion
1979	-	55 (Québec) Service Battalion
1980	-	33 (Halifax) Service Battalion
1981	-	no competition.[2]
1982	-	51 (Montréal) Service Battalion
1983	-	no national competition.[3]

1984-90 - Biennial Competitions[4]

1984	-	33 (Halifax) Service Battalion
1986	-	32 (Moncton) Service Battalion
1988	-	33 (Halifax) Service Battalion
1990	-	14 (Calgary) Service Battalion

1. *William Lennox Thompson Trophy winners 1977 to 1990*; unpublished LFC report, 1995.
2. Because of Exercise RV 81.
3. Instead there were regional competitions. Winners were; East - 33(Moncton) Service Battalion, Central - 26(Hamilton) Service Battalion and West - 11 (Victoria) Service Battalion.
4. 1990 was the last year of Service Battalion competitions. The W.L. Thompson Trophy is now in the EME Branch Museum in CFB Borden.

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APPENDIX 7
WINNERS OF THE
DGLEM (EME BRANCH ADVISOR'S) AWARD

1973	Col W.J. Owens	Contribution to the formation and future of the LORE Branch
1974	LCol D.V. Hampson	Contribution to equipment readiness in CFE
1975	Maj A.L. McEachern	Performance as a military engineer
1976	Maj L.W. Hyttenrauch	Staff Work as LCMM of the Centurion MBT fleet
1977	Capt P.J. Holt	Contribution to the introduction of the Leopard MBT to CFE
1978	Maj L. Guilbault	Work in Support of the Militia component of the LORE Branch
1979	Maj P.A. Vlossak	Contribution to the enhancement of Training and Esprit de Corps within the LORE Branch
1980	LCol V. Pergat	Performance as PM of the Artillery Improvement Project and ELM Trade Advisor
1981	Maj G.A. Walsh	Performance during liaison duties with the US Army
1982	CWO J.C. Sloan	Contribution towards the provision of maintenance support to 1CBG
Special -	CWO A.G. Lowe	Contribution to the LORE Branch as Branch CWO
1983	Mr A.J. Davies	Continuous service and support to land engineering and maintenance activities
1984	Sgt H.W. Munroe	Dedication and performance in providing maintenance support to the Militia
1985	CWO D.W.J. Duermeyer	Innovations in Electro-optics with the Leopard C1 MBT
1986	Maj B. McLean	Dedication and performance as LCMM of the AAGSE fleet
Special -	Mr G.T. Holmes	LCMM support to all elements of the CF
1987	Maj A.W. Price	Leadership in providing engineering support to CFB Edmonton
Special -	WO L.D. George	Support to CAT 87
1988	Maj S.J. Gill	Contribution to the LEME Militia
1989	Col J.G.G. Nappert	Leadership as the first Commandant of CFSEME
1990	Maj D.B. Parker	Support to the LMS as SO Maint at CFTSHQ
1991	CWO R.E. Roy	For "bringing back the Horse" to the LEME Branch
1992	LCol D.N. Redman	Work in integrating the EME Reserves into the LMS
1993	LETE	Contributions in support of UN operations in the former Yugoslavia
1994	CFSEME	Continuous support to the EME Branch specifically during preparations and activities of the 50th EME Anniversary celebrations
1995	Maint Tp A Sqn 8 CH	Continuously providing outstanding support to the Regiment and the CTC in the execution of their national training mandate

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APPENDIX 8
RECOVERY VEHICLES USED BY CANADA'S CRAFTSMEN[1]

Wheeled Recovery Vehicles

Ford 1940 model; 3-ton 4x2, Holmes twin boom wrecker gear, hand powered winch.
60-CWT CMP; General Motors/Ford 3-ton 4x4, Garwood later Holmes twin boom wrecker gear, powered winch.
Diamond-T; 4-ton 6x6, Holmes 10-ton twin boom wrecker gear, front mount 12½-ton winch.
Mack; 5-ton 6x4, Garwood 16-ton twin boom wrecker gear, Garwood rear mount 20-ton winch.
Ward-Lafrance M1A1; 6-ton 6x6, single 10-ton swinging boom, 10-ton front and 20-ton rear winches.
M62; International/Diamond-T 5-ton 6x6, Austin Western 10-ton single swinging extending boom, 10-ton front and 22½-ton rear winches, gas engine
Light Recovery Trailer; various manufacturers, 7-ton 6 wheels,
M543; same design as M62, except boom made by Capital.
M816; AM-General, same general design as M543 except diesel engine.
M.A.N.N.; 10-ton 8x8, 20-ton boom crane, 45-ton winch, purchased for use in Germany.
HLVW; Steyr 10-ton 6x6, Vulcan under reach recovery gear, 25-ton winch, 5-ton boom crane.
Husky (6x6) and **Bison MRT** (8x8); Diesel Division General Motors, Armoured Vehicle General Purpose, 10-ton Capstan crane front and rear pull, 4½-ton HIAB crane.

Tracked Recovery Vehicles

Sherman ARV MkI; based on Sherman M4A4 tank hull, winch not powered.
RAM ARV MkI; based on RAM tank hull, rear deck mounted powered winch.
Sherman ARV Mk II M32B3; 60-ton main winch, frame boom with 10-ton winch.
D-4 Caterpillar Tractor; light recovery.
D-8 Caterpillar Tractor; heavy recovery (some with armoured cabs), winch, no blade.
Centurion ARV Mk II; Royal Ordnance Factories, based on Centurion Mk V hull, 30-ton main winch.
M578; Bowen-MacLaughlin-York, 15-ton crane in fully rotating turret, 30-ton winch.
M113 ARV(L); FMC Corp, modified 12-ton tracked APC, 10-ton rear winch
M113 MRT; FMC Corp, modified 12-ton tracked APC, 2-ton HIAB top-mounted crane
Leopard ARV; Krauss-Maffei improved, 20-ton rotating boom, 35-ton winch, rear-deck carries complete power pack.

Tank Transporters/tractors with Trailers

20-Ton Transporter; Federal Motor Truck 6-ton 6x4 tractor, 12½-ton winch; Trailmobile 20-ton semi-trailer, used for transport of deadheads and D4/D8 Caterpillar tractors.
40-ton Recovery Transporter; Diamond-T 12-ton 6x4 tractor, 20-ton winch; Rogers Brothers 40-ton trailer, 24 tires on 3 axle arrays.
M26A1 Transporter; Pacific Car & Foundry 12-ton 6x6 tractor, twin 30-ton winches behind cab, 17½-ton front winch; Pacific Car & Foundry 50-ton semi-trailer, 8 tires in bogey arrangement.
Autocar; 12-ton 6x4 tractor; 50-ton 8-wheeled trailer, designed for long range transport on Northwest Highway, also used as a tank transporter in NATO Germany.
M52; Diamond-T/Mack 5-ton 6x6 tractor, variant of M series; 20-ton trailer, various manufacturers.
M818; AM General Corp dieselized version of M52 series.
Faun; Faunwerke 8x8 tractor-trailer unit (never separated), twin 40-ton winches, designed for Leopard MBT.

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ABBREVIATIONS

Ranks

Gen	General
LGen	Lieutenant-General
MGen	Major-General
RAdm	Rear-Admiral
BGen	Brigadier-General
Cmdre	Commodore
Brig	Brigadier
Col	Colonel
LCol	Lieutenant-Colonel
Maj	Major
Capt	Captain
Lt	Lieutenant
CWO	Chief Warrant Officer
WO1	Warrant Officer (Class 1)
MWO	Master Warrant Officer
WO2	Warrant Officer (Class 2)
S/Sgt	Staff-Sergeant
WO	Warrant Officer
Sgt	Sergeant
MCpl	Master-Corporal
Cpl	Corporal
L/Cpl	Lance-Corporal
Pte	Private
Cfn	Craftsman
Art	Artisan

Abbreviations

2IC	Second-ln Command
AA	Anti-Aircraft
A and T	Administration and Training
ADE	Army Development Establishment
ADOS(E)	Assistant Director of Ordnance Services (Engineering)
ADP	Automatic Data Processing
AEDB	Army Engineering Design Branch
AEEE	Army Equipment Engineering Establishment
AERE	Aerospace Engineering (Branch)
AFV	Armoured Fighting Vehicle
AFW	Army Field Workshop
AGM	Annual General Meeting
AGSE	Airfield Ground Support Equipment
AHQ	Army Headquarters
AIRCOM	Air Command
APC	Armoured Personnel Carrier
AQ	Adjutant and Quartermaster (Branch)
AQMS	Artificer Quartermaster Sergeant
Art	Artisan
ARV	Armoured Recovery Vehicle
ATI	Annual Technical Inspection
ATO	Ammunition Technical Officer
AVGP	Armoured Vehicle General Purpose
AWD	Advanced Workshop Detachment
BAA	Brigade Administrative Area
BARV	Beach Armoured Recovery Vehicle
Bde	Brigade
BEF	British Expeditionary Force
BEME	Brigade Electrical and Mechanical Engineer
BLP	Backloading Point
BM(L)	Base Maintenance (LAND)
BRS	Beach Recovery Section
CA	Canadian Army
CA(R)	Canadian Army (Regular)
CAB	Canadian Armoured Brigade Workshop
CAFATTT	Canadian Armed Forces Advisory and Training Team Tanzania
CAFTTG	Canadian Armed Forces Training Team Ghana
CARDE	Canadian Army Research and Development Establishment
CASC	Canadian Army Service Corps
CASF	Canadian Active Service Force (World War Two) or Canadian Army Special Force (Korean War)
CB	Confined to Barracks
CBG	Canadian Brigade Group
CBW	Canadian Base Workshop
CDA	Conference of Defence Associations
CDS	Chief of the Defence Staff
CELE	Communication & Electronics Engineering (Branch)
CEM	Chief of Engineering and Maintenance
CEME	Canadian Electrical & Mechanical Engineers
CFB	Canadian Forces Base
CFE	Canadian Forces Europe
CFHQ	Canadian Forces Headquarters
Cfn	Craftsman
CFSAOE	Canadian Forces School of Aerospace and Ordnance Engineering
CFSCLOE	Canadian Forces School of Communication and Land Ordnance Engineering
CFSH	Canadian Field Surgical Hospital
CFTS	Canadian Forces Training System
CGS	Chief of the General Staff
CIB	Canadian Infantry Brigade
CIBG	Canadian Infantry Brigade Group
CMBG	Canadian Mechanized Battle Group
CMHQ	Canadian Military Headquarters
CMHQ	Canadian Military Headquarters
CMP	Canadian Military Pattern
CO	Commanding Officer
COC	Canadian Ordnance Corps
COME	Chief Ordnance Mechanical Engineer
COMERU	Canadian Ordnance Mechanical Engineering Reinforcement Unit
CORU	Canadian Ordnance Reinforcement Unit
CQ	Company Quartermaster stores, Company Quartermaster Sergeant
CREME	Commander Royal (Canadian) ELectrical & Mechanical Engineers
CRU	Canadian Reinforcement Units
CS	Canadian Support (workshop)
CTC	Combat Training Centre
CTTC	Canadian Technical Training Corps
D Mech	Director of Mechanization
DAG	Departure Assistance Group
DCGS(A)	Deputy Chief of the General Staff (Administration)
DCMEM	Director Combat Mobility Engineering and Maintenance
DCO	Deputy Commanding Officer
DD	Duplex Drive
DDD	Director of Design and Development
DDME	Deputy Director Mechanical Engineering
DEE	Director Equipment Engineering
DEME	Director of Electrical and Mechanical Engineering
Det	Detachment
DGLEM	Director General of Land Engineering & Maintenance
DGLEPM	Director General of Land Equipment Program Management
Div	Division
DLMSEM	Director Land Mobility Systems Engineering and Maintenance
DM and S	Department of Munitions and Supply
DMA	Director Mechanization and Artillery
DME	Director of Mechanical Engineering
DMM	Director of Mechanical Maintenance
DND	Department of National Defence

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DOS Director of Ordnance Services
DQMG(D&D) Deputy Quartermaster General (Design and Development)
DQMG(EE) Deputy Quartermaster General (Equipment Engineering)
DREV Defence Research Establishment-Valcartier
DSVEM Director Support Vehicles Engineering and Maintenance
DVA Department of Veterans Affairs
DVP Drowned Vehicle Point
EGS Tech Electrical Generation Systems Technician
EIS Equipment Issue Scale
EME Electrical and Mechanical Engineer
EMER Electrical and Mechanical Engineering Regulation
EOD Explosives Ordnance Disposal
ETFC Ecole technique des forces canadiennes
ETQMS Engineering Technician Quartermaster Sergeant
ETV European Type Vehicle
FCS Fire Control Systems
FDL Forward Defence Locality (Line)
FMC Mobile Command
FRP Forward Repair Platoon
FRY Former Republic of Yugoslavia
GMT General Military Training
GO General Order
GOC General Officer Commanding
GPMG general purpose machine gun
GS General Service
Herc CC133 Hercules aircraft
HQ Headquarters
I and A Instruction and Administration
ICCS International Commission of Control and Supervision
ICSC International Commission(s) for Supervisions and Control
IOM Inspector of Ordnance Machinery
IOR Immediate Operational Requirement
ITRU Infantry Troops Recovery Unit
L of C Lines of Communication
LAA Light Anti-Aircraft
LAD Light Aid Detachment
LCMM Life Cycle Material Manager
LCT Landing Craft Tank
LETE Land Engineering and Test Establishment
LFC Land Forces Command
LMS Land Maintenance System
Log Ops Logistics Operations
LOMMIS Land Ordnance Maintenance Management Information System
LORE Land Ordnance Engineering
LOREA AGM LORE Association Annual General Meeting
LTB LORE Technical Bulletin
MARCOM Maritime Command
MBT Main Battle Tank
MD Military District
MEMET Mobility Equipment Minor Engineering Tasking
MGO Master General of the Ordnance
MILE Military Engineering (Branch)
MIR Medical Inspection Room
MLVW Medium Logistics Vehicle (Wheeled)
MRG Main Repair Group
MRR Miscellaneous Recurring Replacement
MRT Mobile Repair Team
MSE Mobile Support Equipment
MSE Tech Mobile Support Equipment Technician
MSS Militia Servicing Section
MTG Maintenance Technique Group
MTSC Militia Training and Support Centre
MUST Mobile Universal Surgical Tent
NCM Non-Commissioned Member
NCO Non-Commisioned Officer
NDHQ National Defence Headquarters
NPAM Non-Permanent Active Militia
OA Corps Officer Administering the Corps
OC Officer Commanding
OES Ordnance Engineering System
OFP Ordnance Field Park
OIC Officer In Charge
OJT On-job Training
OME Ordnance Mechanical Engineer
OP Observation Post
ORBAT Order of Battle
OS Occupation Specification
PAM Permanent Active Militia
PETE Proof, Experimental and Test Establishment
POW Prisoner of War
QA Quality Assurance
QMG Quartermaster General
R&I Receipt and Issue
RAEME Royal Australian Electrical and Mechanical Engineers
RAMD Reliability, Availability, Maintainability and Durability
RAOC Royal Army Ordnance Corps
RCA Royal Canadian Artillery
RCAC Royal Canadian Armoured Corps
RCAF Royal Canadian Air Force
RCAMC Royal Canadian Army Medical Corps
RCASC Royal Canadian Army Service Corps
RCE Royal Canadian Engineers
RCEME Royal Canadian Electrical and Mechanical Engineers
RCEME(M) RCEME Militia
RCEME(RF) RCEME Reserve Force
RCEMEA AGM RCEME Association Annual General Meeting
RCHA Royal Canadian Horse Artillary
RCIC Royal Canadian Infantry Corps
RCN Royal Canadian Navy
RCOC(E) Royal Canadian Ordnance Corps (Engineering Branch)
REME Royal Electrical and Mechanical Engineers
Res Reserve
RFSS Reserve Force Servicing Section
RM Tech Refrigeration and Mechanical Technicion
RNZEME Royal New Zealand Electrical and Mechanical Engineers
RO Routine Orders
RPSG Repairs Parts Scales Group
RQ RCEME Quarterly
RSS Regular Support Statt
RTB RCEME Technical Bulletin
RV Rendez-vous (place)
SC Standard Commercial
SD Staff Duties
SEME School of Electrical and Mechanical Engineering
SEV Special Equipment Vehicle
SMP Standard Military Pattern
SO Standing Order, Staff Officer
SOME Senior Ordnance Mechanical Engineer
SOP Standard Operating Procedure
SP Self-propelled
SPS Spare Parts Stores Section
SPV Special Purpose Vehicle
SSO Senior Staf Officer
SVC BN Service Battalion
TFR Technical Failure Report
TL Trade Level
TQ Trade Qualification
UCR Unsatisfactory Condition Report
UN United Nations
UNDOF United Nations Disengagement Observer Force
UNEF United Nations Emergency Force
UNFICYP United Nations Forces in Cyprus
UNMO United Nations Military Observer
UNMOGIP United Nations Military Observer Group in

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	India-Pakistan
UNOC	United Nations Organization in the Congo
VDE	Vehicle Development Establishment
VOR	Vehicle off the Road
Wng O	Warning Order
WO1/WOI	Warrant Officer (Class 1)
WO2/WOII	Warrant Officer (Class 2)

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Associations; see EME Associations, RCEME Association, RCEME Association of Alberta, RCEME Club, RCEME Prairie Vets,

Branch Advisor; see Attilator, Chief Ordnance Mechanical Engineer, Director Electrical and Mechanical Engineering (DEME), Director Mechanical Engineering (DME), Director Mechanical Maintenance (DMM), Director Ordnance Services (DOS), Director-General Land Engineering and Maintenance (DGLEM), Director-General Land Equipment Program Management (DGLEPM), Director-General Ordnance Services (DGOS), Head of Corps of the Corps of RCEME, Master General of the Ordnance (MGO), Officer Administrating the Corps (OA Corps), Principal Inspector of Ordnance Machinery, Surveyor-General,

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Symbols; Badge, Birthday, Bluebell, Branch CWO cane, Colours, Commemorative Monument, Flag, March, Memorials (see above), Motto, Museum, Patron Saint, Prayer, RSM's cane, Skill demonstration team, Trades, Trophies (see below),

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Trophies; see 9.6 inch RML gun, RAEME Tray, REME Alms Dish, REME/LEME Talismen, Sadie, Rose Bowl,

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